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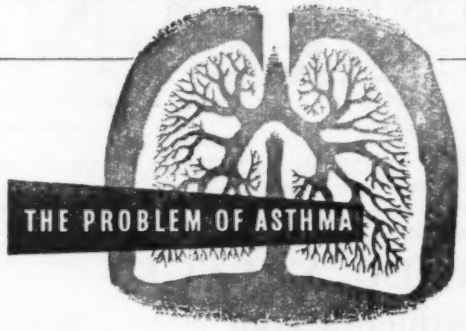


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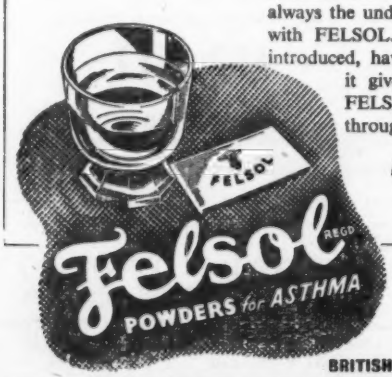


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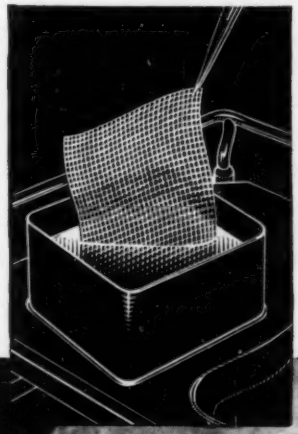

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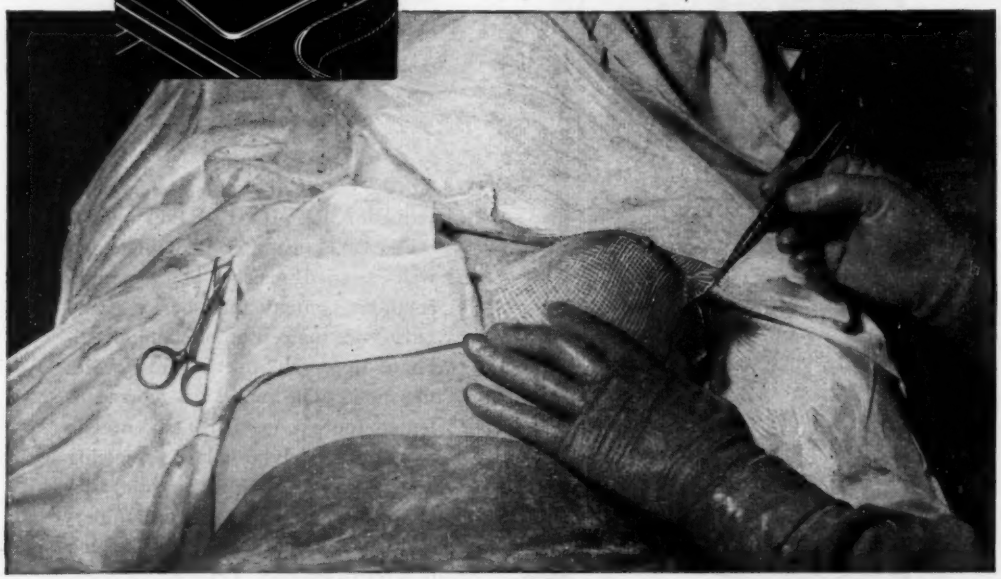

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* *Therapeutische Umschau VIII*, 1952, 10, 143

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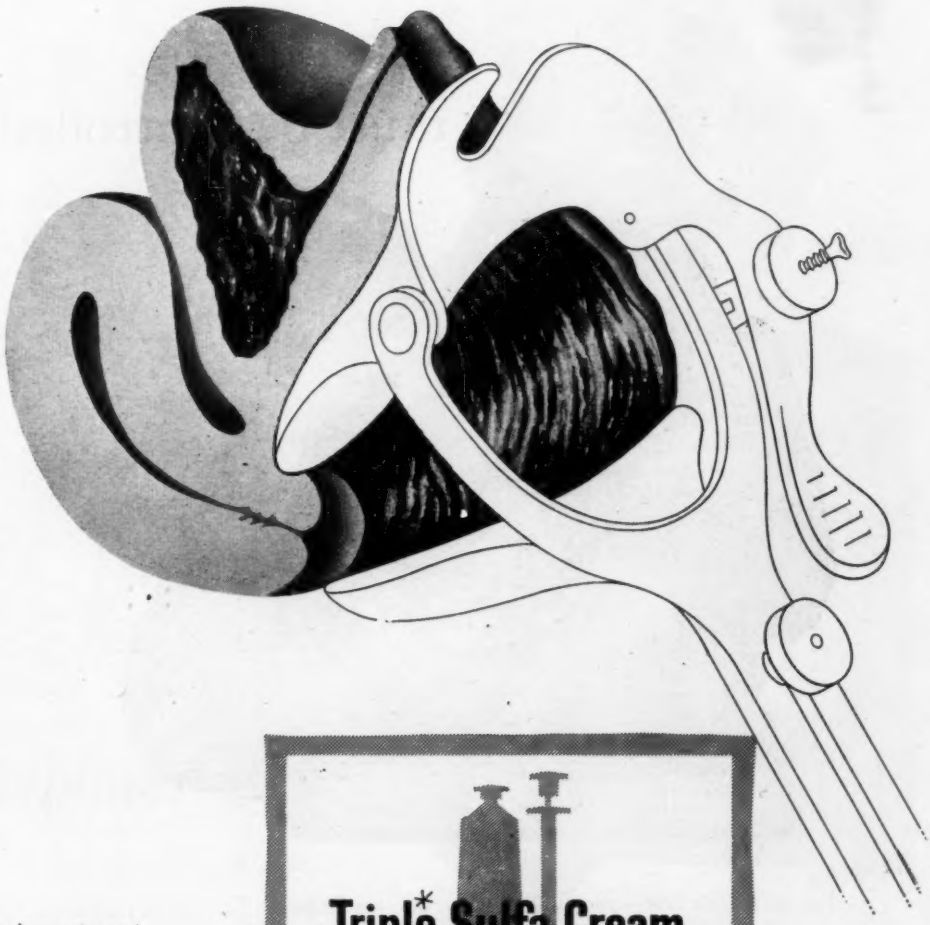

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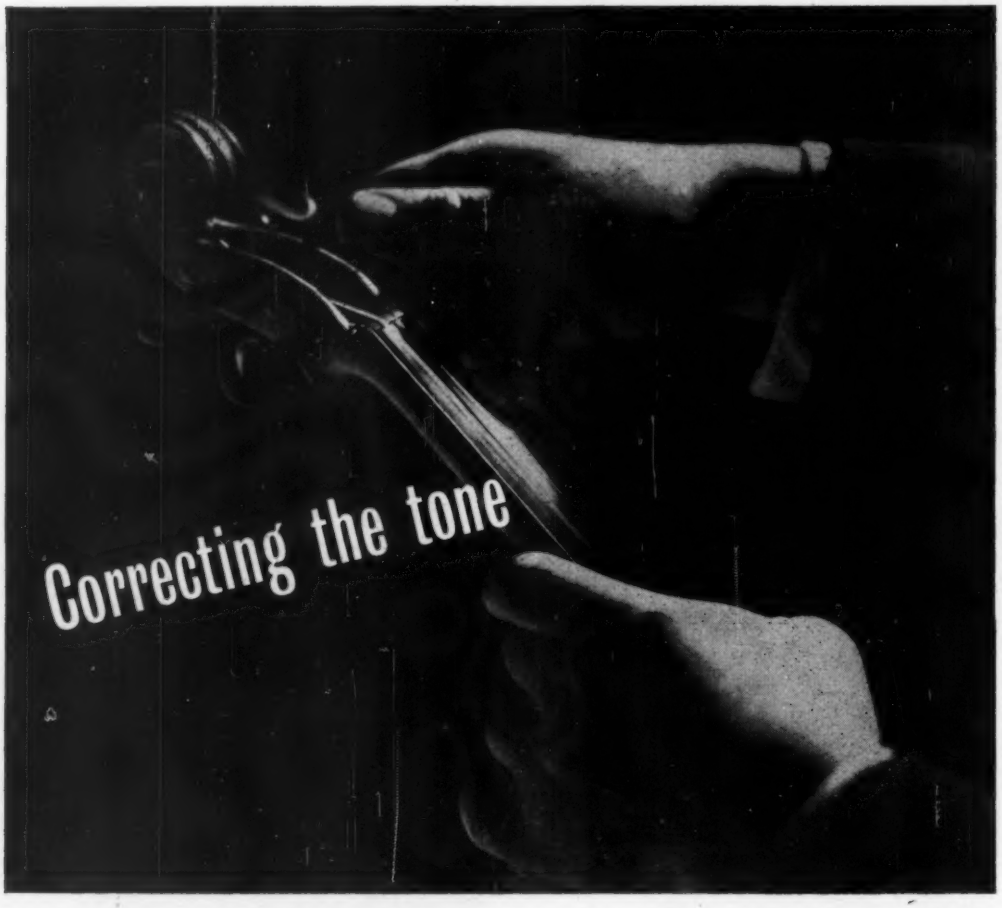


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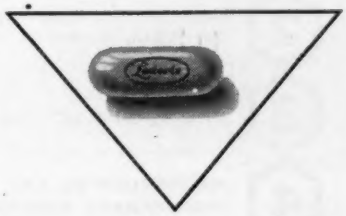

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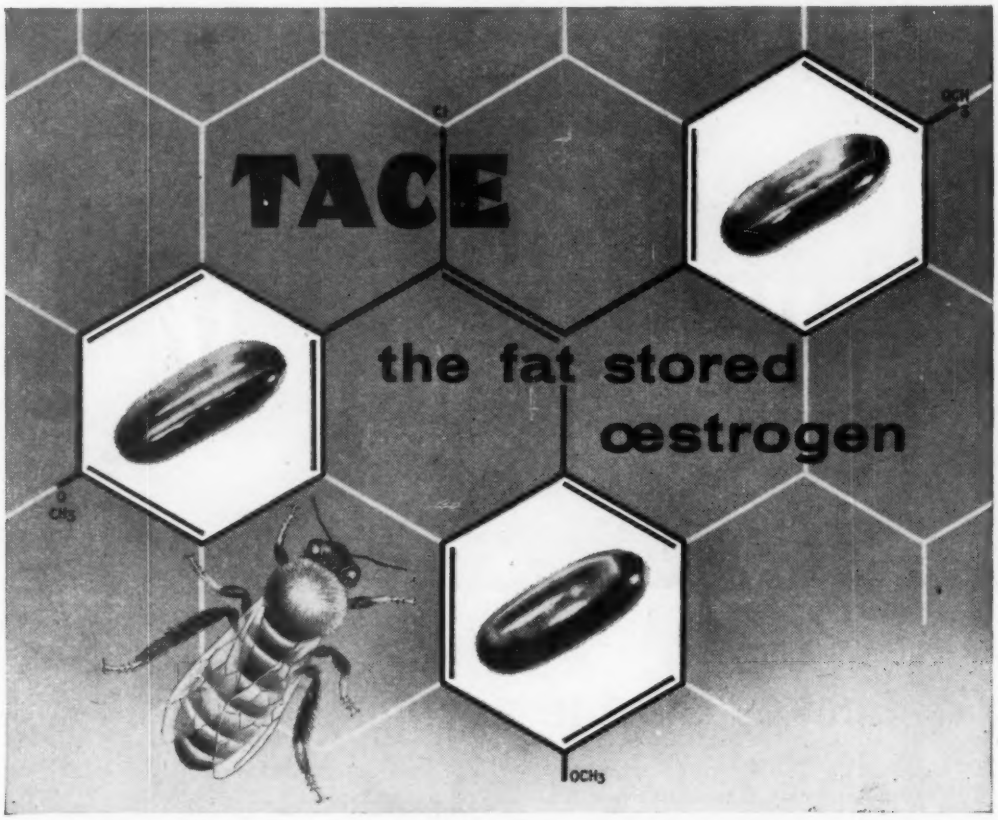


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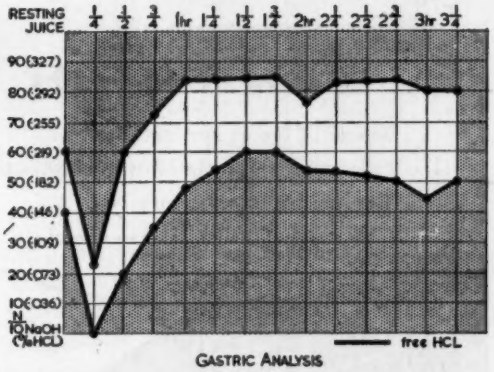


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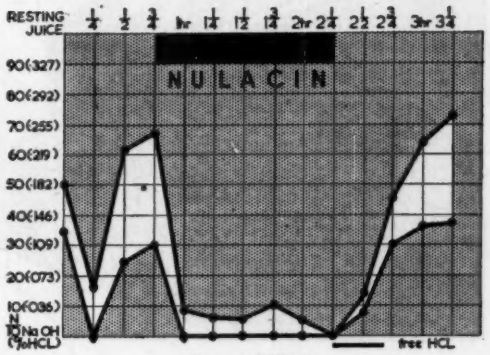


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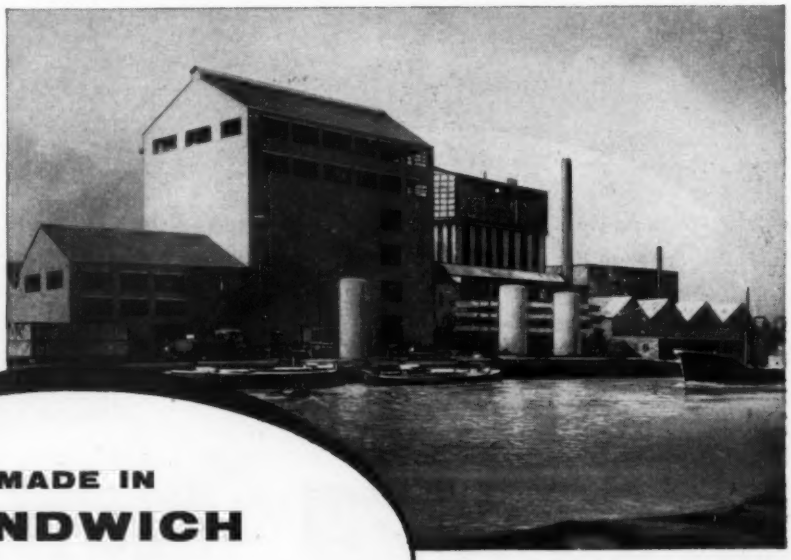

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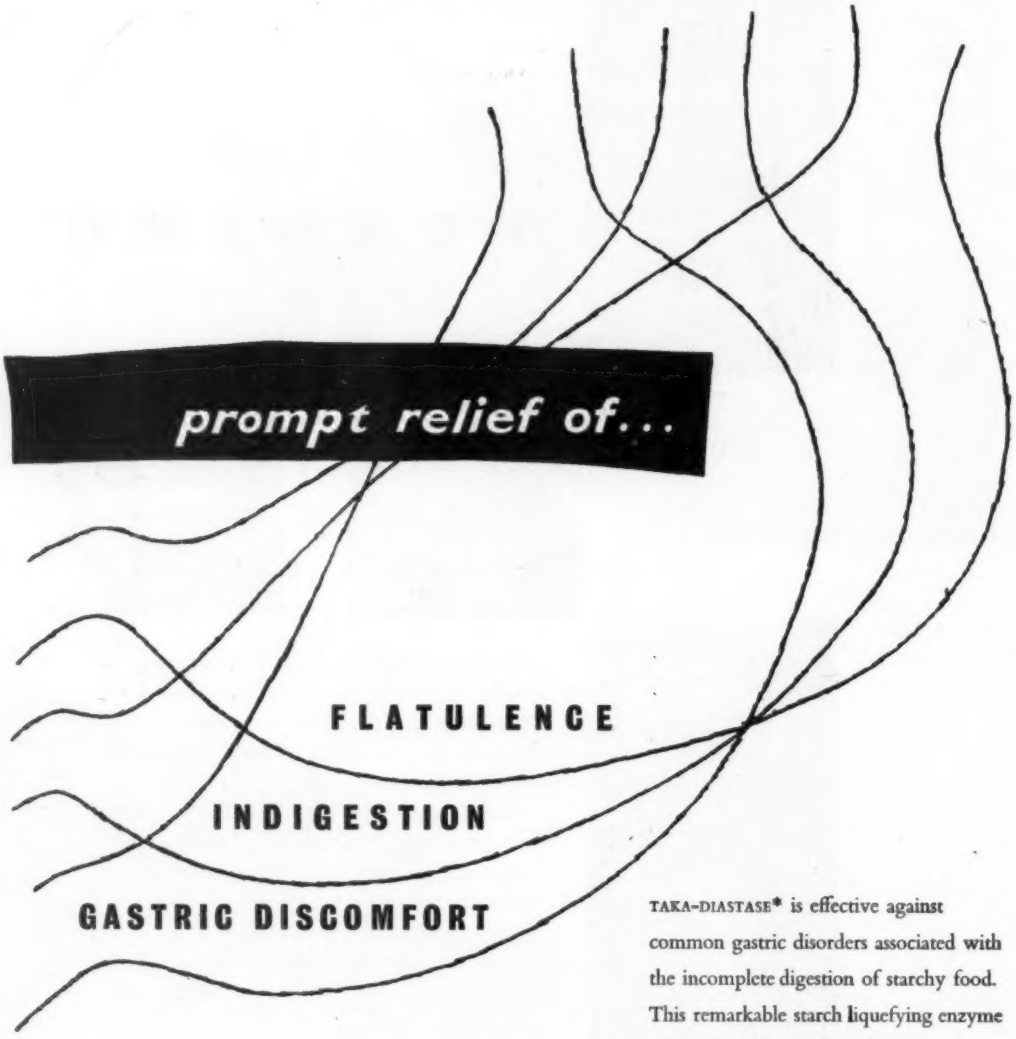


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* *Tubercle*, 1957, **38**, 16.
** *Report. Ann., Conf. Amer. College Chest Physicians*, June, 1956.

**(Reprints of this paper will gladly be sent on request. Please ask for publication No. 57.)**

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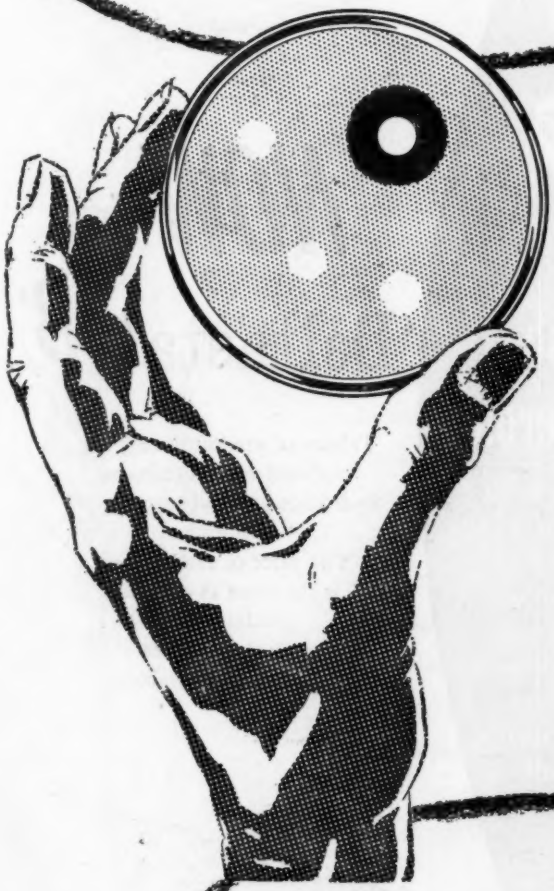

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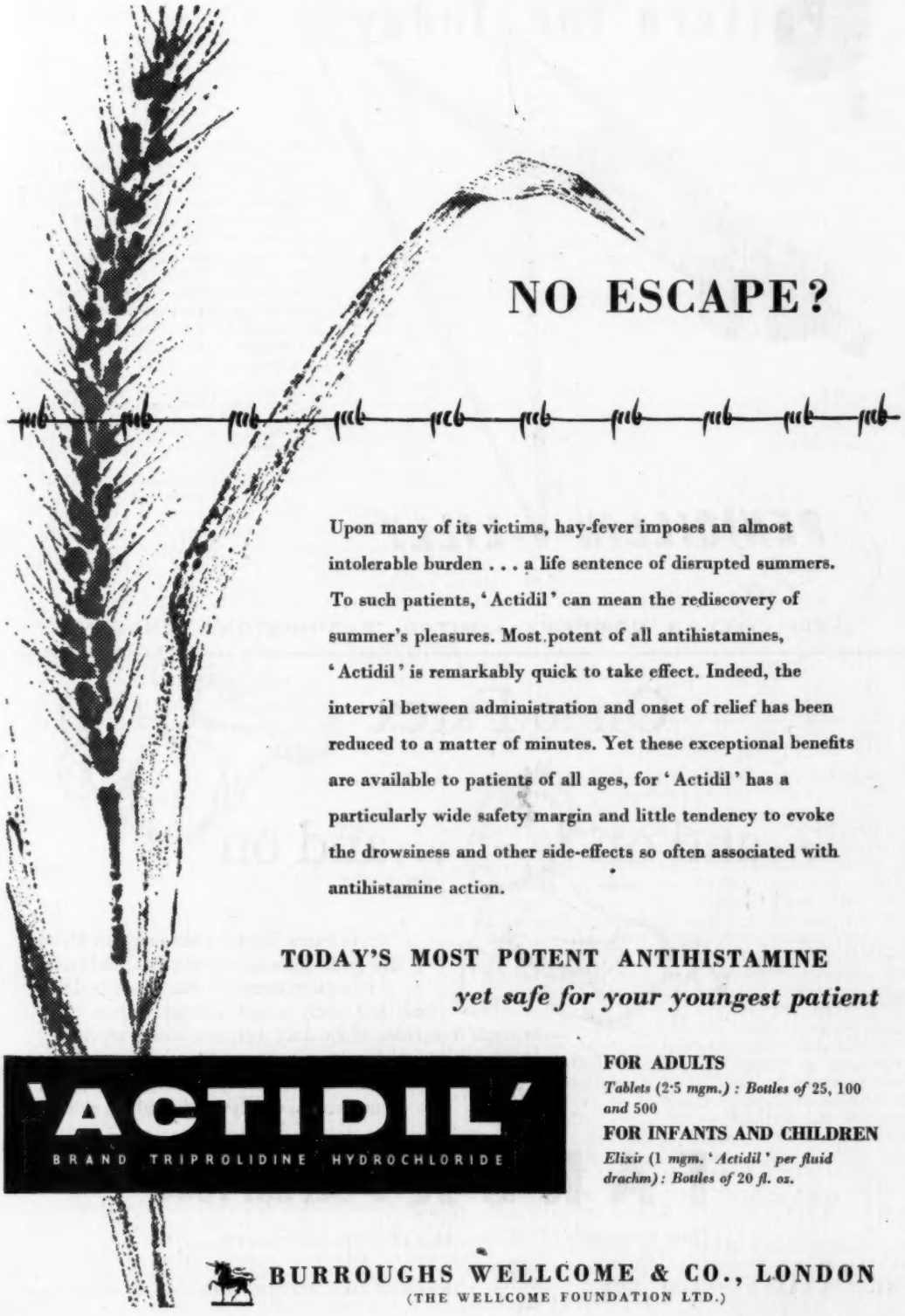

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# DIET AND CORONARY THROMBOSIS

## HYPOTHESIS AND FACT *

JOHN YUDKIN
M.A., Ph.D., M.D. Camb., M.R.C.P., F.R.I.C.
PROFESSOR OF NUTRITION IN THE UNIVERSITY OF LONDON AT QUEEN ELIZABETH COLLEGE

MUCH has been written about the rôle of dietary factors in causing coronary thrombosis. In particular, many believe that the disease is related to the amount of dietary fat, or of a particular sort of fat. In support of these beliefs, we are presented with evidence of an epidemiological nature. We are told, for example, that the higher the average fat-consumption in a country, the higher the mortality due to coronary thrombosis (coronary mortality). Or we are told that the rise in the number of coronary deaths in this country was accompanied by a rise in the consumption of hydrogenated fats.

From time to time, however, it becomes evident that some of the epidemiological data do not fit these simple hypotheses. For example, in one investigation the chance of suffering from coronary disease was found to be twice as high in general practitioners as in other doctors (Morris et al. 1952), and it is difficult to see how this can be explained solely on the basis of differences in diet.

As more and more of these awkward facts turn up, one begins to have the uneasy feeling that both the proponents and opponents of a dietary hypothesis are quoting only those data which support their view. I thought it worth while therefore to draw together as many of these data as are reasonably available, and see what sort of picture emerged.

* Based on the chairman's address to the Nutrition Panel (Food Group) of the Society of Chemical Industry. A summary of this address appears in *Chemistry and Industry*, 1957, p. 627.

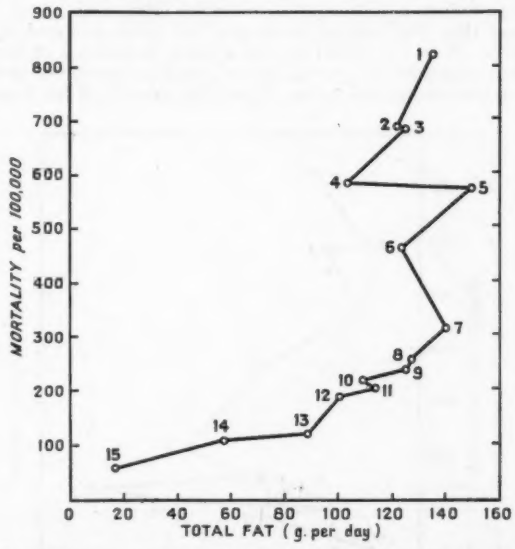


**Fig. 1—Coronary mortality and total fat intake in various countries.**

Mortality refers to number of men aged 55–64 in 100,000 certified as dying of coronary disease in 1952. The numbers refer to countries in order of decreasing mortality as follows: (1) U.S.A., (2) Australia, (3) Canada, (4) Finland, (5) New Zealand, (6) United Kingdom, (7) Denmark, (8) Sweden, (9) Norway, (10) Netherlands, (11) Switzerland, (12) Western Germany, (13) France, (14) Italy, (15) Japan.

In relating diet to coronary mortality, I have drawn on three different sorts of statistics. The first is a comparison between diets and coronary mortality in different countries for the same year; the most recent comprehensive figures available were for 1952, or 1951–52. The second comparison is between diets and coronary mortality in different classes in our own country. The third comparison is between trends in diets and trends in coronary mortality in this country since 1928, when the present basis of classification of deaths due to coronary thrombosis was introduced.

### International Comparisons

Let us begin by looking at the sort of figures which have been quoted in support of the hypothesis that

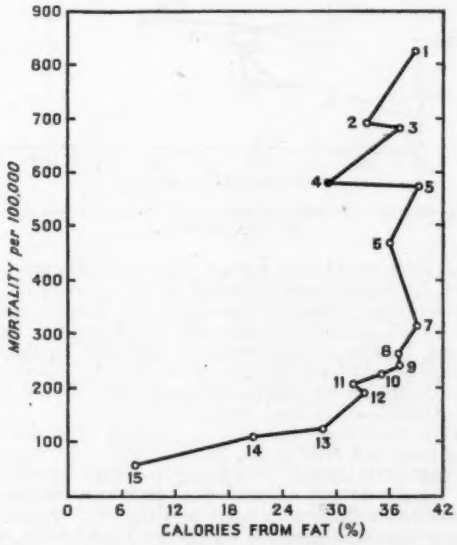


**Fig. 2—Coronary mortality and percentage calories from fat in various countries. For key, see fig. 1.**

coronary mortality is related to total fat consumption (Food and Agriculture Organisation 1955, World Health Organisation 1955, 1956). In 1952, the number of men aged 55–64, in every 100,000, who were certified as dying of coronary thrombosis in Japan, Italy, Western Germany, Switzerland, and New Zealand was 57, 113, 190, 205, and 576. The average daily intake of fat (in grammes) was reported as 16, 57, 101, 113, and 149. These figures show an excellent relationship between fat intake and coronary deaths. Yet we can select another group of five countries—Norway, Denmark, United Kingdom, Canada, and U.S.A.—where the figures for coronary mortality were 239, 319, 470, 689, and 829, and the daily fat intake (in grammes) 125, 140, 123, 123, and 135. Thus, with about the same intake of fat, there was a range of coronary mortality of nearly fourfold. If we combine all the available figures, we see that in general countries have a slowly increasing coronary mortality when the fat increases up to about 120 g. a day; with intakes of about 130 g. a day, there is no relationship with coronary mortality (fig. 1). The possible significance of this point will be discussed later.

Some workers have quoted fat intake, not as the absolute amount, but as a percentage of the total calories which are supplied by fat. I have not understood the reason for doing this. It would imply that a country like Italy, in which the average intake of calories is

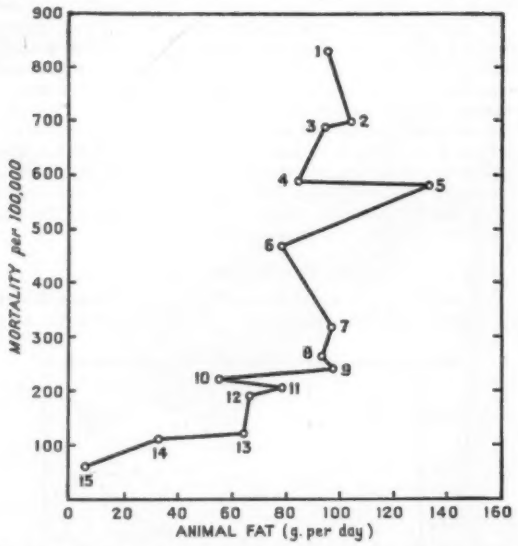


Fig. 3—Coronary mortality and animal-fat intake in various countries. For key, see fig. 1.

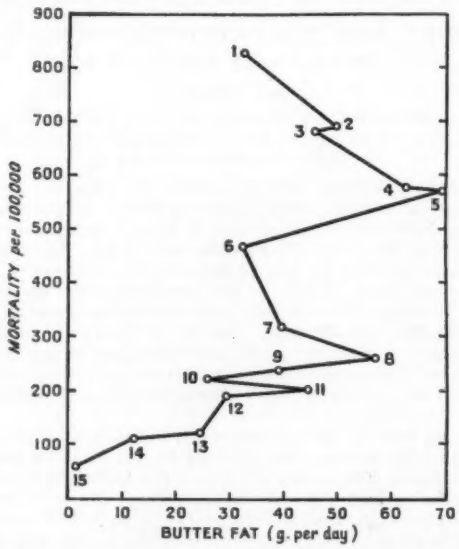


Fig. 4—Coronary mortality and butter-fat intake in various countries. For key, see fig. 1.

about 2500, would have a much higher coronary mortality if the fat intake were increased at the expense of, say, carbohydrate, without changing the caloric intake. I know of no evidence that this would be so. Nevertheless, I have related coronary mortality to the percentage of calories derived from fat (fig. 2). We see that there is almost no difference in the form of the curve from that in which total fat intake is used.

It has been suggested that the amount of animal fats, from milk and from meat, is more important than the amount of total fat in causing coronary thrombosis. The figures do not support this, since the relationship is less direct than with total fats (fig. 3). Those who believe that the culprit is butter fat, from butter, milk, and cheese, receive even less support (fig. 4). Nor is there support for the view that vegetable fat is protective, for there is no relationship, either positive or negative, between the intake of vegetable fat and coronary mortality (fig. 5).

Again, there is no relationship with the consumption of sources of hydrogenated fats—margarine, compound fats, and shortenings (fig. 6). The most obvious discrepancy here is in Norway, which has by far the highest consumption of these fats of all the countries we have examined. It has been suggested that this may be due to the high consumption of fish by the Norwegians (Sinclair 1956). The argument is that hydrogenated fats induce a deficiency of essential fatty acids (E.F.A.) and that this may be made good by E.F.A. supplied by fish. It so happens that the greater proportion of the fish consumed in Norway is cod, with an extremely low content of fat and E.F.A. The total amount of fat from

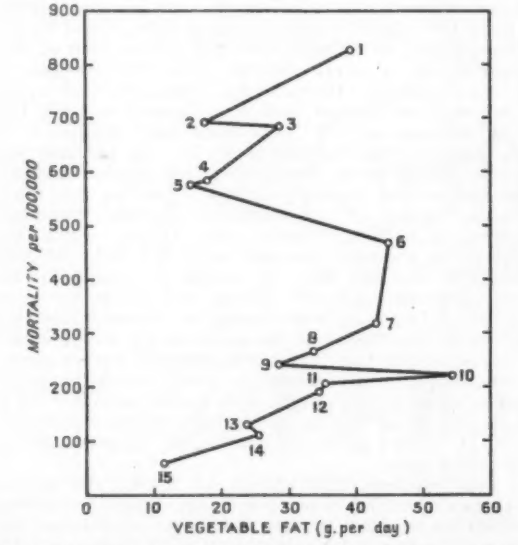


Fig. 5—Coronary mortality and vegetable-fat intake in various countries. For key, see fig. 1.

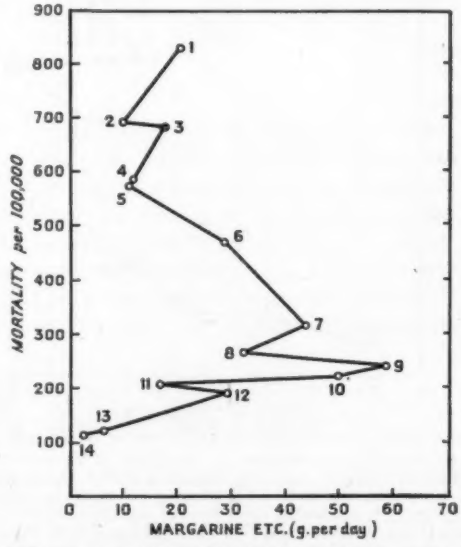


Fig. 6—Coronary mortality and intake of margarine, compound fats, and shortenings in various countries. For key, see fig. 1.

CORONARY MORTALITY AND INTAKE OF MARGARINE &C., AND FISH IN DIFFERENT COUNTRIES

| Country | Coronary mortality | Intake (g. per head per day) | |
|---|---|---|---|
| | | Margarine, &c. | Fish |
| Norway .. | 239 | 57·6 | 110·9 |
| Canada .. .. | 689 | 17·4 | 16·7 |
| Switzerland .. | 305 | 16·3 | 5·7 |
| New Zealand .. | 576 | 10·6 | 19·4 |
| W. Germany .. | 190 | 28·3 | 19·5 |

fish averages only 3 g. a head a day. Nevertheless, let us examine the suggestion a little more closely. Let us first compare two countries with similar average consumption of sources of hydrogenated fats, Canada and Switzerland. The much lower coronary mortality in Switzerland could then be explained if there were a higher consumption of fish; in fact, the Swiss consume much less fish than the Canadians (see accompanying table). Again, let us look at two countries—New Zealand and Western Germany—with a similar fish consumption. Here, we might explain the much lower mortality in Western Germany if there were a lower intake of sources of hydrogenated fats, but in fact it is much higher.

It is true that the degree of hydrogenation of margarine and similar fats varies in different countries. Nevertheless, such figures as I have been able to obtain, while altering the relative position of some of the points in fig. 6, give no better relationship between the consumption of hydrogenated fats and deaths due to coronary thrombosis.

I thought it would be interesting, before leaving the comparison between different countries, to see how the consumption of the nutrients other than fat was related to coronary mortality. There seems to be no relationship with the intake of total protein (fig. 7) but some relationship, about as good as for total fat, with intake of animal protein (fig. 8). There is a better relationship with intake of sugar than with any other nutrient we have examined (fig. 9). The relationship with total caloric intake is about as good as that with the intake of total fat or of animal protein (fig. 10).

These international comparisons, then, do not support the view that total fat or animal fat is the direct and

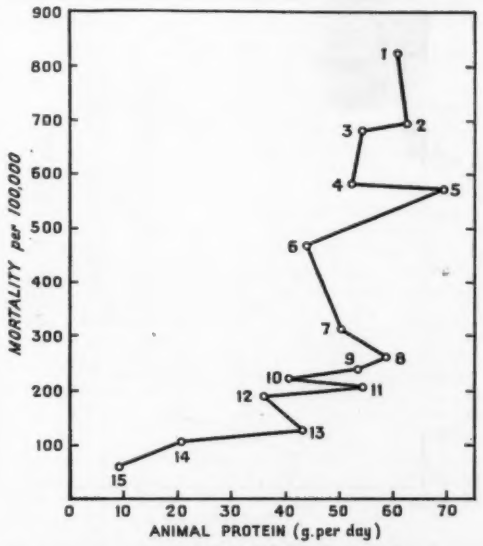


Fig. 8—Coronary mortality and animal protein intake in various countries. For key, see fig. 1.

single cause of coronary thrombosis. Neither do they support the view that hydrogenated fats are related at all to coronary thrombosis. The relationships which do emerge, especially that with sugar, suggest that coronary thrombosis is associated with higher living standards. This is supported by the relationship which exists between coronary mortality and national income per head (fig. 11).

### Comparisons by Class

The latest figures of comparative rates of mortality from coronary disease in different occupations in this country were published for 1950 (Registrar-General 1951). The Registrar-General's classification is in five classes: V unskilled, IV semiskilled, III skilled, II intermediate, and I professional.

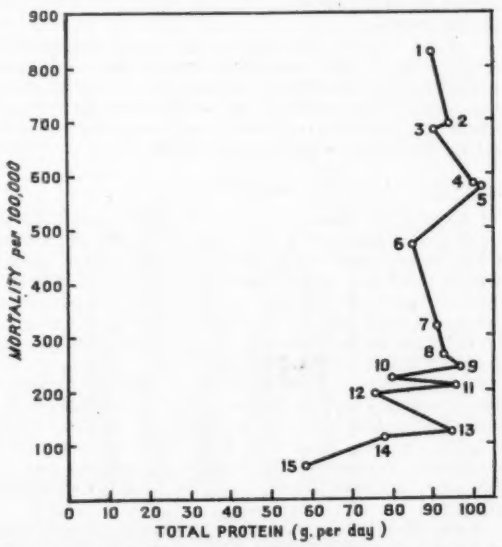


Fig. 7—Coronary mortality and total protein intake in various countries. For key, see fig. 1

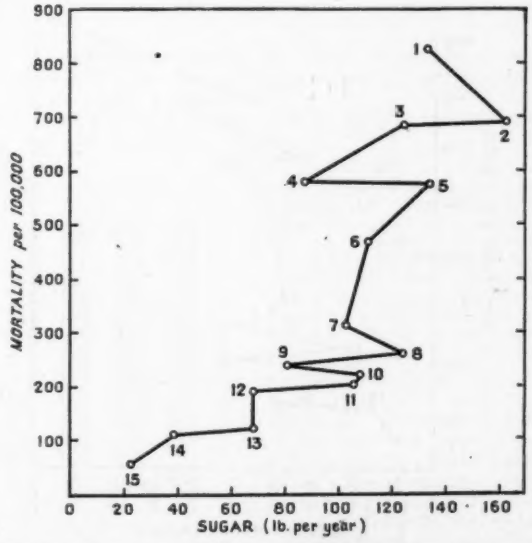


Fig. 9—Coronary mortality and sugar intake in various countries. For key, see fig. 1.

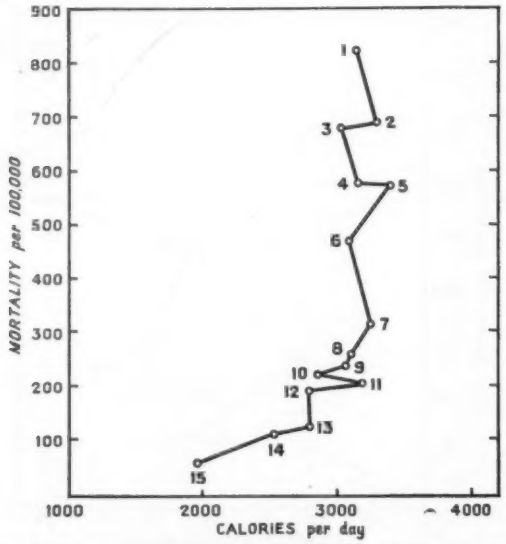


Fig. 10—Coronary mortality and caloric intake in various countries. For key, see fig. 1.

Figures published by the Ministry of Agriculture, Fisheries, and Food for different income classes for the same year, 1950, are not entirely satisfactory for comparing diets and coronary mortality. There is insufficient detail, for example, from which to calculate the intake of butter fat. Again, the lowest class, D, includes those living on pensions as well as those on low earned incomes. Since, however, general trends in food consumption were much the same in later years, I have chosen to use the figures for 1954. In that year, the data for food consumption are more complete, and class D is divided into those with and those without earners. In addition, the division is made into five "earning" classes (Ministry of Agriculture, Fisheries, and Food 1956). The classification of the Ministry is based on income: D1 up to £6 weekly (families with at least one earner), C £6–9, B £9–15, A2 £15–24, A1 over £24. It is clear, of course, that the two sorts of classification by occupation and by income will not be directly comparable. It is, however, reasonable to suggest that, on the whole, occupational class is also related to income. Thus, if there is a causal relationship between diet and coronary mortality, then obvious trends in mortality, shown when classification is made according to occupation, should show (at least to some extent) in trends in diet when classification is made according to income.

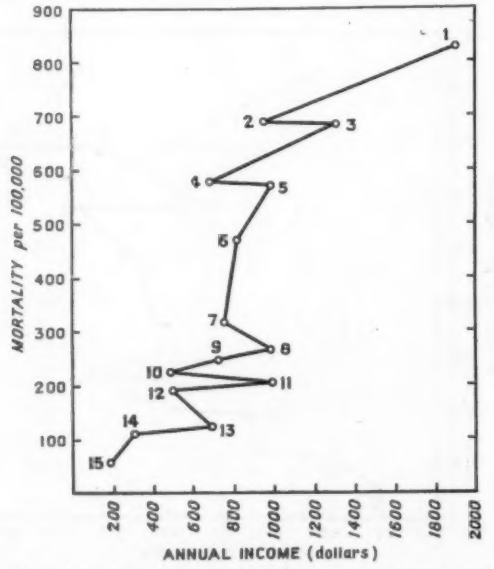


Fig. 11—Coronary mortality and annual income in various countries. For key, see fig. 1.

The differences in coronary mortality by occupation are considerable. The chance of a semiskilled worker dying of the disease is only about half that of a professional man (fig. 12).

The consumption of fat, and of butter fat, show the same sort of trends with increasing income, but the differences are small (figs. 13 and 14). On the other hand, the consumption of margarine and other sources of hydrogenated fats falls with increasing income, the opposite of what would be expected if these fats were important in causing deaths by coronary thrombosis (fig. 15). Higher income was associated with a very small increase in the consumption of total protein, and a slightly greater increase in the consumption of animal protein (fig. 16). These associations are to some extent similar to those found by our comparisons between different countries, but there is no similar association between coronary mortality and the intake of sugar or of calories, since there is little or no difference by income-class (figs. 17 and 18).

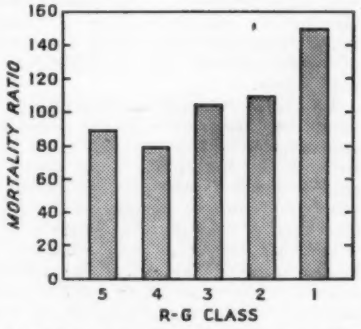


Fig. 12—Relative coronary mortality in various occupational classes in U.K., 1950: men aged 20–64.

Let me emphasise again that, since the two classifications of mortality and of diet are different, no significance can be attached to the exact values of the figures I have quoted. I believe nevertheless that it is legitimate to conclude that, for example, people in professional occupations, with a higher coronary mortality, earn more than people in unskilled or semiskilled occupations; because of this, they eat as a group somewhat more fat and animal protein and less margarine.

### Historical Trends

I have given the figures for coronary deaths in this country only since 1928. The figures for the years before 1928, though based on a different classification, give no indication of any considerable fluctuation in mortality. I do not therefore wish to attach any great importance to dietary changes before that date, but I have thought it worth while to include such earlier figures for the diets as are available (Hollingsworth 1957).

First, let me draw attention to the almost continuous rise in certified deaths due to coronary thrombosis since 1928, interrupted only by a slight fall in 1940–42 and in 1953 (figures from the Registrar-General's Annual Statistical Reviews). By 1943 the mortality-rate was the same as before the war, and by 1950 it had doubled (fig. 19).

A superficial examination of the trends of consumption of total fats suggests that this is related to trends in coronary mortality. In fact, however, the fall in both

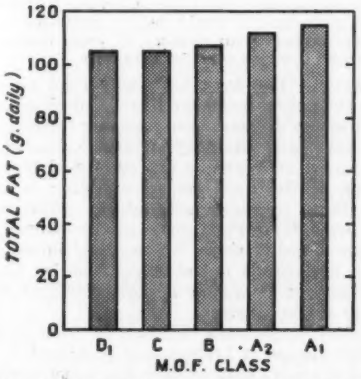


Fig. 13—Consumption of total fat in various income classes in U.K., 1954.

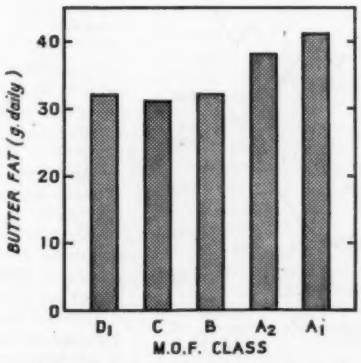


Fig. 14—Consumption of butter-fat in various income classes in U.K., 1954.

at the beginning of the war was followed by a rise in mortality several years before the consumption of fat had reached its full pre-war level (fig. 19). The lack of relationship with intake of animal fats is more obvious, since this had not returned to the pre-war level by 1954 (fig. 20). There was no relationship between coronary mortality and consumption of vegetable fat (fig. 21).

Consumption of sources of hardened fats is also not related to coronary mortality (fig. 22). At the beginning of the late war, consumption increased considerably while coronary mortality fell. The subsequent fairly steady rise in mortality was accompanied by fluctuating intakes of these fats. Finally, whilst as I have said the figures of coronary mortality before 1928 are probably less accurate, there is no evidence that the high intake of margarine and other hydrogenated fats around 1920 was associated with a high coronary mortality.

Sugar intake rose before the recent war, with a rise in coronary mortality. But from 1940 to 1950, sugar intake was lower than before the war, although coronary mortality had doubled during that time (fig. 23).

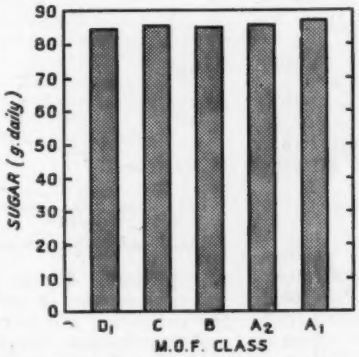


Fig. 17—Consumption of sugar in various income classes in U.K., 1954.

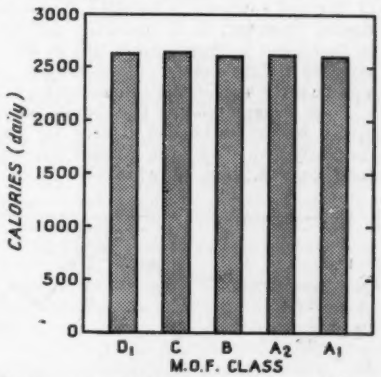


Fig. 18—Intake of calories in various income classes in U.K., 1954.

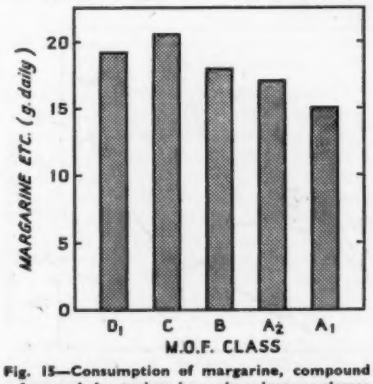


Fig. 15—Consumption of margarine, compound fats, and shortenings in various income classes in U.K., 1954.

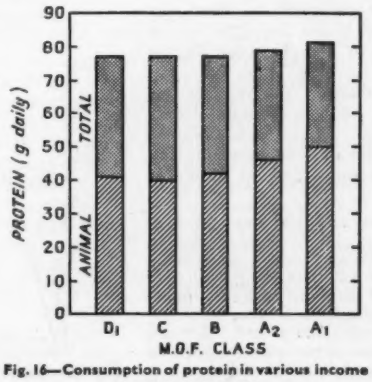


Fig. 16—Consumption of protein in various income classes in U.K., 1954.

By far the best correlation I have found with trends in coronary mortality is in the number of radio and television licences (fig. 24). There is nearly as good a correlation with the number of registered motor-vehicles.

## Discussion

### *Validity of Statistics*

*Coronary mortality.*—For a variety of reasons, I have used, when they are available, figures for men aged 55–64. Mortality from coronary diseases is two to three times greater in men than in women. Deaths in men over 64 are less certainly due to single causes (Morris 1955). Finally, death due to coronary disease is much more common between 55 and 64 years than in any other decade. But no significant differences in trends emerge if the figures for total male mortality are used.

In comparing figures for different countries, I have used all the data which are available. I have, that is, included every country for which figures have been published both for coronary mortality and for food consumption.

The publication from which figures for coronary mortality have been taken says:

> "It should be borne in mind . . . that the procedures followed for determining the underlying cause of deaths are still not absolutely identical in the various countries and that therefore the data cannot be considered strictly comparable between different countries" (World Health Organisation 1956).

Nevertheless, for the majority of the countries I have compared, the diagnosis is likely to be sufficiently similar not to invalidate the general trends which have emerged from the comparisons I have quoted. The least accurate figures are probably those for Japan, but the death-rate there is so

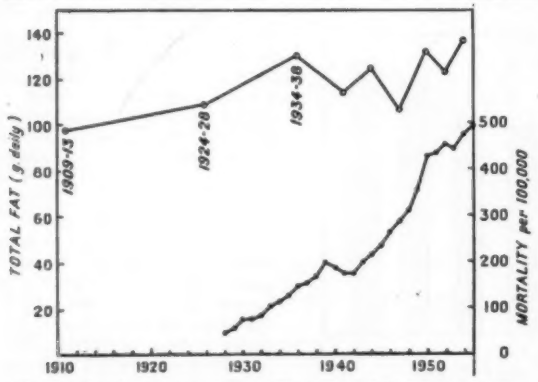


Fig. 19—Trends in coronary mortality and total fat intake in U.K.

much lower than that of any of the other countries studied that corrected figures would again not be likely to invalidate the general trends.

It is not very likely that there are significant differences in diagnosis of mortality in different classes in England and Wales. But it is possible that figures for the trends since 1928 are less reliable, in so far as there may well have been changes in the past 30 years in the tendency of doctors towards or against diagnosis of the disease. Again, however, it is generally agreed that there has in fact been a considerable rise in the disease, and the possible differences in diagnosis are unlikely to alter significantly any of the conclusions we have drawn.

*Food consumption.*—The same sorts of limitations apply to the published figures for food consumption. Similarly, we may take it that the wide differences in food consumption to which we have drawn attention

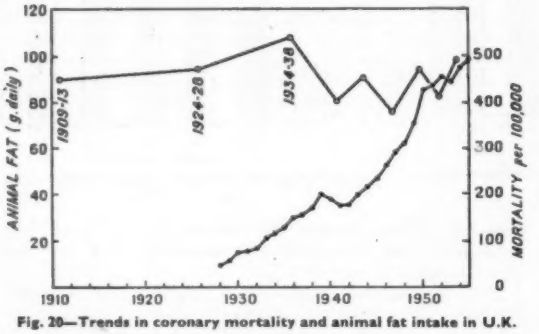


Fig. 20—Trends in coronary mortality and animal fat intake in U.K.

in making our comparisons were sufficient to leave our main conclusions unaffected, even if the absolute figures for food consumption are likely to include some degree of inaccuracy.

One point, however, is important. The figures for food consumption are averages for whole populations, or large sections of populations. There is almost no information about the distribution of food consumption between these large numbers of people. Let me illustrate this by a hypothetical example.

Consider two countries A and B with the same average daily consumption of sugar of 150 g. Let us suppose that in country A some people eat very little and some a great deal; we might find that 25% of them ate less than 120 g. and 25% ate more than 180 g. In country B, we may imagine a much more uniform distribution of consumption; here, only 5% of the people might be eating less than 120 g. and 5% more than 180 g. We shall see later that a plausible hypothesis is that a dietary factor may come into play only when a certain threshold of consumption is exceeded. If such a dietary factor were sugar, and the threshold were a daily intake of 180 g., then country A would have a much higher incidence of coronary disease than country B, even though the average daily intake of sugar was 150 g. in both.

*Negative conclusions.*—The hypothesis which we have set out to test by the comparisons we have made is that there is a single or major dietary factor causing coronary thrombosis. We have seen that any evidence which is suggestive from one set of figures is not confirmed from another set. Thus, whilst total fat consumption is in general higher in those countries with higher coronary mortality, it was lower for several years in this country whilst mortality continued to rise. We may legitimately conclude that the hypothesis is not supported by the available data, either for fat or for a particular sort of fat or for any other single nutrient.

One of the dietary hypotheses which has been put forward is that the disease is fundamentally caused by a single nutrient deficiency, that of essential fatty acids (Pfeifer and Holman 1955), but that other nutrients are involved because they modify the need for E.F.A. (Sinclair 1956). Thus it is said that the requirements for E.F.A. are increased by increase in total fat, decrease in vitamins $B_6$ and E, and increase in "unnatural"

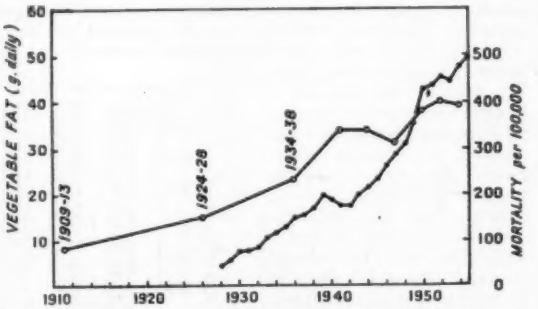


Fig. 21—Trends in coronary mortality and vegetable fat intake in U.K.

fats produced during hydrogenation. For example, the consumption of bread made of improved flour of low extraction will increase the requirements for E.F.A. and thus increase the chances of deficiency, because low extraction flour contains less vitamins $B_6$ and E, and because the process of improvement further reduces vitamin E. Consider then the situation in this country during 1940–50. Intake of total fat was smaller, and of hydrogenated fats greater, than before the war. Since there was an increase in the extraction-rate of flour, and no change in the method or degree of improvement the intake of vitamins $B_6$ and E, as well as of E.F.A., from this source was greater. The higher intake of

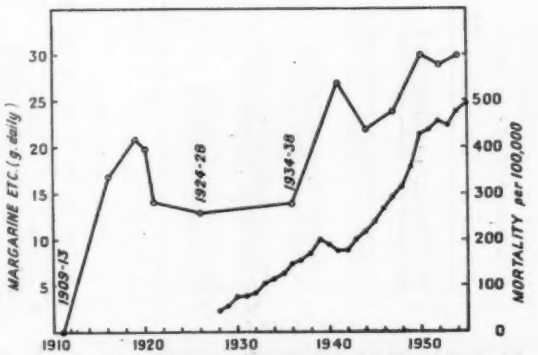


Fig. 22—Trends in coronary mortality and intake of margarine, compoun ats, and shortenings in U.K.

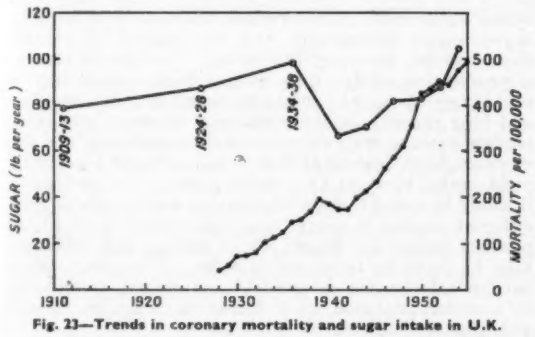


Fig. 23—Trends in coronary mortality and sugar intake in U.K.

hydrogenated fats also gave directly more vitamin E and more E.F.A. Thus, during the decade, deficiency of E.F.A. became less likely because of (1) increased E.F.A. intake, (2) decreased total fat intake, (3) increased vitamin $B_6$, (4) increased vitamin E. Deficiency of E.F.A. was more likely because of only one factor, the increase in "unnatural" fatty acids. If E.F.A. deficiency was commoner in 1950 than in 1940, these acids must therefore be presumed to be extremely potent "anti-E.F.A." substances. We should then expect that they would outweigh much of the effect of related dietary factors, and result in a close association between the amount of sources of hydrogenated fats consumed and the incidence of coronary disease. We have however seen, from our international comparisons, that high consumption of margarine, compound fats, and shortenings is not necessarily associated with increase in coronary

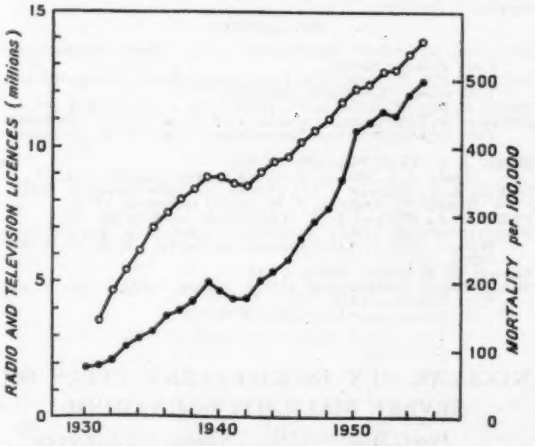


Fig. 24—Trends in coronary mortality and number of radio and television licences in U.K.

mortality; from our comparison of classes in this country, we have seen that high consumption of these fats is associated with lower coronary mortality.

It should not be necessary to say that these negative conclusions in no way detract from the important experimental observations such as those made on the effects of dietary components on the amount of cholesterol or of particular lipoproteins in the blood. Two points, however, are worth emphasising. One is that it has not been demonstrated that there is any certain relationship between these changes induced by relatively short-term dietary experiments, and the liability to coronary catastrophe in those normally consuming particular diets. Secondly, whilst most of the experiments have been concerned with the effect of changes in dietary fat, it has also been shown that increase or decrease in calories, mainly or entirely through carbohydrate, can increase or decrease some of the lipoproteins in the blood (Nichols et al. 1956, 1957). This observation may be relevant to a consideration of general, rather than specific, dietary factors—a consideration to which I shall return.

*Positive Suggestions*

It seems that the hypothesis of a unitary dietary cause cannot be sustained, but it is possible to extend its validity by introducing two subsidiary hypotheses, of lag and of threshold.

*Hypothesis of lag.*—It is reasonable to suppose that the development of coronary thrombosis, by the process commonly (though not universally) accepted, requires a fairly lengthy period. That is to say, it may well take several years for a constant high intake of, say, fat to produce atheromatous plaques in the coronary arteries sufficient to give thrombus formation of an intensity to lead to cardiac ischæmia and death. We may then suppose that the continued higher intake of fat in Britain up to 1940 led to a rise in coronary mortality in the next decade or more, even though fat consumption fell during that time. Yet this additional hypothesis is still not sufficient. We have seen that there was a fall in coronary mortality rates in Britain in the early part of the war; an even greater and more protracted fall was seen during the war in Norway. This implies that, if significant dietary changes can produce a significant change in coronary mortality, they may do so almost immediately.

*Hypothesis of threshold.*—Just as the well-known nutritional deficiencies will occur only with nutrient intakes below a certain threshold, so we may suppose that increasing fat intake might lead to coronary thrombosis only above a certain threshold. The shape of the curve relating fat intake with coronary deaths in different countries supports this. It suggests that, on the whole, a daily intake below 120 g. or so is associated with a low incidence of the disease and an intake above this figure with a high incidence. If to this we add that there may well be, as we have seen, differences in distribution of intake, so that the same average intakes in different countries may nevertheless mean quite different proportions consuming more than the threshold, we can go some way to explaining the considerable differences in mortality in different countries associated with similar high average intakes. But this would imply that, for example in this country, a higher proportion of general practitioners than of consultants consume fat in quantities above the threshold, since twice as many general practitioners die of coronary thrombosis. It is possible, though unlikely, that this is so, but the onus of proof lies with those who believe in a unitary dietary theory of the disease. They would have to explain, too, why farmers have a low incidence of coronary thrombosis (Registrar-General 1951), when one would have supposed that their intake of fats, especially of animal fats, would have been higher than the average during the decade or more of rationing. Finally, they would have to show that those countries with an average intake of, say, total fat of about 130 g. have a varying distribution of intake sufficient to account for their considerable differences in mortality.

*Multiple causes.*—A consideration of all the data I have quoted, and of the known differences in mortality in different occupations, suggests that such a unitary dietary theory, however modified by considerations of lag, of threshold, and of individual variation in dietary intake, is less plausible than a theory of multiple causes. I find it difficult to imagine that there are significant differences in diets between bus drivers and bus conductors, between general practitioners and consultants, between dock labourers and building labourers, yet the former of each pair has a much higher mortality from

coronary disease than the latter (Registrar-General 1951, Morris et al. 1952).

It seems more likely that several factors are concerned in producing coronary thrombosis and that we should do better to attempt to discover what they are, and their relative importance, than to insist on a single cause, whether dietary or not. One of these which is relevant to the data I have presented is diminished physical activity. The countries with higher incidence of coronary disease are those with, in general, greater leisure. There is for example quite a reasonable relationship between the number of motor-cars and the incidence of the disease in different countries, as there is between the rise in both in Britain in the past 30 years. Again, it is in the more sedentary occupations that mortality is usually higher.

Decreased physical activity may affect coronary disease in two ways. First, it may result in a person having a less well developed coronary supply than one who is more active, that is, fewer and narrower vessels for supplying the heart. This might mean that a thrombus forms more readily in such a person; it would certainly mean that a thrombus is more likely to cause fatal ischæmia. Second, diminished physical activity is likely to be associated with overweight, so that the work of the heart is greater. Recently, it has been shown that, whilst there is in general a direct relationship between physical activity and caloric intake, the relationship breaks down when physical activity is very low (Mayer et al. 1956). That is, persons who lead sedentary lives tend to have the same caloric intake as those with a small but nevertheless greater physical activity. Such sedentary persons are consequently of greater weight.

We now can see a possible general dietary factor rather than a specific one. In comparing countries, we saw that coronary mortality was related to better living standards, which shows in dietary terms as well as in terms of income, motor-cars, and radio licences. The diets generally contain more calories, as well as more protein, fat, and sugar. Thus, their populations are on the whole eating more and also tending to expend less physical effort. When we compared classes in Britain, we saw that the total caloric intake was much the same, but it is professional people (who, we may imagine, do less physically) who have the highest incidence of coronary thrombosis. I mentioned earlier that changes in caloric intake have been shown experimentally to change the amount of some lipoprotein fractions in the blood. This supports the view that a possible factor in coronary thrombosis may be the relationship between physical activity and the general level of diet, expressed in calories rather than in any single nutrient.

*Predisposing and Precipitating Causes*

The suggestion of multiple causes of coronary thrombosis makes it possible to suggest an explanation for the puzzling temporary fall in coronary deaths during the war, reported in Britain and in Norway. It seems likely that changes in the coronary arteries are produced over a long period, but that there are also more rapidly acting factors which may precipitate thrombus formation. The predisposing causes would be concerned in the long-term trends of incidence of the disease; the precipitating causes would be concerned in the short-term changes in incidence such as those in the early 1940s.

*Profitable Investigations*

What remains to be done is to isolate the possible causes and to evaluate their relative importance. I have mentioned the possibilities of a specific dietary factor, general dietary factors, and physical activity. Others which have been suggested include smoking and nervous strain. A study of much smaller groups than whole populations or broad occupational classes will help to reduce the number of variables. Ideally, one would like to relate, in individuals, the chances of developing coronary thrombosis, and the history as regards diet, exercise, smoking, and so on. This would involve a prospective study, such as has been carried out so revealingly in regard to the association between smoking and lung cancer. In the meantime, however, statistical studies such as we have here been considering are also of value, to the extent that they may, if used cautiously, yield useful hints as to possible causes. In particular, it would be useful if more information were available from different regions in single countries, where some of the possible causes are known to be similar and attention may be given to those which differ. Ultimately, when enough information is available, it should be possible by multifactorial analysis to decide which are the factors, and what is their relative importance.

**Summary**

A consideration of some of the more readily available data on the incidence of coronary deaths and on food consumption makes it difficult to support any theory which supposes a single or major dietary cause of coronary thrombosis.

It is suggested that relative over-consumption of food, associated with reduced physical exercise, may be one of several causes of the disease.

These causes are likely to be divisible into predisposing causes and precipitating causes. Their identification requires more study of groups where some of the possible causes are relatively constant, so that differences in incidence of coronary disease may be related to the other possible causes.

I am very grateful to Mr. T. B. Morgan and Mrs. M. Willoughby of my department for help in compiling these figures.

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# NUCLEAR SEX IN DIFFERENT TYPES OF SEVERE MALE HYPOGONADISM

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"Barr has thrown a large stone in the pond and the ripples are still widening."—*The Lancet* (1954).

THE determination of nuclear sex has been used within many new fields of theoretical and clinical medicine. The latest discovery is a discrepancy between phenotypic and nuclear sex in certain cases of testicular atrophy, the so-called Klinefelter's syndrome (Plunkett and Barr 1956a, b, and c, Bradbury et al. 1956, Riis et al. 1956a and b, Jackson et al. 1956, Witschi et al. 1956, Sohval et al. 1956, Nelson 1956).

This unexpected discovery led us to investigate the nuclear sex in various forms of male hypogonadism. We

report here the sex-chromatin in 28 cases of severe male hypogonadism.

## Methods

The nuclear sex was determined in desquamated cells from the oral mucosa (Moore and Barr 1955), and, in addition, urethral epithelium was examined in some cases (Carpentier et al. 1956, Riis and Pilgaard 1956) and peripheral blood in others (Davidson and Smith 1954).

The urinary excretion of androgens was determined biologically (Hamburger et al. 1945) and in the later cases by chromatographic fractionation of the urinary 17-ketosteroids (Johnsen 1956b). In each case the result was compared with the normal excretion for the age-group and recorded in relation to age.

The excretion of gonadotrophins was studied by a tannin-precipitation method which shows only the increased excretion and only affords positive results in two-thirds of male castrates (Engberg 1948).

Since the series includes only severe cases characterised by pronounced genital infantilism and absence of sexual function, no systematic studies of the sperm were made.

## Results

The accompanying table shows the sex chromatin in 28 cases of male hypogonadism, the diagnoses, and the most important clinical findings.

Only in the 6 cases of typical Klinefelter's syndrome did we find a discrepancy between sexual phenotype and nuclear sex. 5 of these patients had chromatin-positive

FINDINGS IN MALE HYPOGONADISM

| Case no. | Social sex | Age (yr.) | Diagnosis | Secondary sexual characters | Gynæcomastia | Testes | Testicular biopsy | Urinary gonadotrophins (mouse-units) | Urinary excretion of androgens | Sex-chromatin in epithelium (drumsticks in granulocytes) |
|---|---|---|---|---|---|---|---|---|---|---|
| 1 | M | 19 | Klinefelter's syndrome [1] | Moderately reduced | ++ | Atrophic | Hyalinisation of tubules, dense masses of Leydig cells | 50 | Normal | +(6/173) |
| 2 | M | 21 | „ „ | Moderately reduced | ++ | „ | Hyalinisation of tubules, dense masses of Leydig cells | <50 | Moderately reduced | +(3/500) |
| 3 | M | 16 | „ „ | Normal | ++ | „ | Hyalinisation of tubules, dense masses of Leydig cells | <50 | Normal | + |
| 4 | M | 20 | „ „ | Moderately reduced | ? | „ | Hyalinisation of tubules, dense masses of Leydig cells | >50 | „ | +(6/484) |
| 5 | M | 25 | „ „ | Moderately reduced | ++ | „ | Tubules sclerosed, dense masses of Leydig cells | <50 | Slightly reduced | +(1/500) |
| 6 | M | 32 | „ „ | Moderately reduced | ++ | „ | Almost complete hyalinisation, dense masses of Leydig cells | >50 | .. | + |
| 7 | M | 33 | Eunuchoidism [2] | Greatly reduced | – | „ | .. | <50 | Greatly reduced | – |
| 8 | M | 32 | „ | Greatly reduced | – | „ | .. | <50 | Greatly reduced | – |
| 9 | M | 34 | „ | Greatly reduced | – | „ | Complete tubular atrophy, few Leydig cells | <50 | Greatly reduced | – |
| 10 | M | 39 | „ | Greatly reduced | – | „ | .. | >50 | Reduced | – |
| 11 | M | 42 | „ | Greatly reduced | – | „ | .. | <50 | „ | – |
| 12 | M | 27 | „ | Moderately reduced | – | „ | .. | >50 | Moderately reduced | – |
| 13 | M | 19 | „ | Greatly reduced | – | „ | .. | >50 | Greatly reduced | – |
| 14 | M | 20 | Hypospadia, testicular atrophy | Normal | (+) | Hypoplastic | Reduced spermatogenesis, abundant Leydig cells | .. | Normal | – |
| 15 | M | 22 | Cryptogenic testicular hypoplasia | Slightly reduced | – | Moderately hypoplastic | Tubular degeneration, normal Leydig cells | <50 | „ | – |
| 16 | M | 31 | Arrested spermatogenesis | Normal | – | Normal | Arrest of spermatogenesis | <50 | „ | – |
| 17 | M | 30 | Dwarfism (Brissaud type) | Greatly reduced | – | Atrophic | .. | <50 | Greatly reduced | |
| 18 | M | 29 | Dwarfism (Brissaud type) | Greatly reduced | – | „ | .. | <50 | Greatly reduced | – |
| 19 | M | 21 | Primary infantilism [3] | Greatly reduced | – | „ | .. | <50 | Greatly reduced | – |
| 20 | M | 19 | „ „ | Reduced | – | Hypoplastic | .. | .. | Reduced | – |
| 21 | M | 31 | Adiposogenital dystrophy [4] | Greatly reduced | – | Atrophic | .. | .. | „ | – |
| 22 | M | 31 | Adiposogenital dystrophy [4] | Greatly reduced | – | „ | .. | .. | „ | – |
| 23 | M | 34 | Adiposogenital dystrophy [4] | Greatly reduced | – | „ | .. | <50 | Greatly reduced | – |
| 24 | M | 18 | Adiposogenital dystrophy [4] | Reduced | – | „ | Reduced spermatogenesis, few Leydig cells | .. | Reduced | – |
| 25 | M | 16 | Adiposogenital dystrophy [4] | „ | – | Hypoplastic | .. | <50 | „ | – |
| 26 | M | 16 | Adiposogenital dystrophy [4] | Moderately reduced | – | Slightly hypoplastic | .. | <50 | „ | – |
| 27 | M | 14 | Adiposogenital dystrophy [4] | Absent | – | Atrophic | .. | <50 | „ | – |
| 28 | M | 9 | Adiposogenital dystrophy [4] | „ | – | Undescended | .. | .. | .. | – |

1. Strictly according to the descriptions given by Klinefelter et al. (1942) and Heller and Nelson (1945).
2. Castration syndrome due to primary degeneration of testes ("functional prepuberal castration," "primary testicular failure").
3. Cryptogenic retardation of general development ("pituitary dwarfism").
4. Syndrome of feminine type of obesity with secondary (hypothalamic ?) hypogonadism, or the late sequelæ of this syndrome in adults (cf. Johnsen 1956a).

epithelial nuclei, and 1, in whom only peripheral blood was examined, exhibited "drum-sticks" with the frequency found in normal women (6/484).

### Discussion

Our finding that Klinefelter's syndrome differs from the other forms of male hypogonadism confirms the previous work mentioned above.

All 6 patients with Klinefelter's syndrome had nuclear sex-chromatin. Only a few of the published cases did not show this phenomenon: Jackson et al. (1956) reported 2 chromatin-negative cases and Sohval et al. (1956) another 2; and Nelson (1956) found several chromatin-negative cases in which testicular biopsy seemed to indicate that the seminiferous tubules must have been destroyed at a later stage of development than that of sexual differentiation in the fœtus. These cases Nelson calls examples of false Klinefelter's syndrome in contradistinction to the true syndrome in which the sex differentiation must have been defective, giving rise to a discrepancy between phenotypic sex characteristics and nuclear sex. We did not find a case of false Klinefelter's syndrome; presumably it is rather uncommon and must be regarded as a form of eunuchoidism. Although Klinefelter's syndrome does not lend itself to therapy, it is of interest to be able to distinguish between true and false cases. Therefore the nuclear sex should be determined in every case of gynæcomastia with atrophy of the testicular germinal epithelium.

Nothing definite is known about the ætiology of the true Klinefelter's syndrome, but it must be assumed that a genetic factor is responsible. Nadler et al. (1950) and Grumbach et al. (1956) have reported familial Klinefelter's syndrome and myotonia atrophica. Moreover Bassøe (1956) had a case of Klinefelter's syndrome in a patient with familial amyotonia congenita. This patient's sister had Turner's syndrome, which must also be assumed to be due to a genetic defect. Finally, Nelson (1956) states that up to 9 cases of Klinefelter's syndrome have been observed in the same family. Although it is difficult to demonstrate genetic causal factors in a disease which involves infertility, these findings indicate that Klinefelter's syndrome is the result of a genetic defect in the sex-chromosomes.

In this connection it is interesting that in 2 cases of Klinefelter's syndrome Plunkett and Barr (1956c) observed chromatin-positive epithelial nuclei and a low incidence of "drum-sticks" in the granulocytes. This finding was confirmed in 2 of our 4 patients whose sex was determined on epithelium as well as granulocytes. The frequency of "drum-sticks" was as low as 1/500 and 3/500, whereas in the other 2 it was 6/173 and 6/484. Briggs and Kupperman (1956) found no "drum-sticks" at all in 3 cases of Klinefelter's syndrome. Although the frequency of "drum-sticks," unlike the sex-chromatin of the epithelial nuclei, may depend on non-chromosomal factors (Briggs and Kupperman 1956), these discrepancies between the sexual characteristics of the different cells may well be due to a defect and not a lack of the male chromosomes in true Klinefelter's syndrome. It is therefore probably unjustifiable to interpret the chromatin-positive epithelial nuclei in Klinefelter's syndrome as a proof that the patients are inter-sexual females. That the condition is still far from elucidated is apparent from the finding of spermatogenesis in chromatin-positive cases (Bunge and Bradbury 1956). No conclusions can yet be drawn from the nuclear sex about the genetic sex in Klinefelter's syndrome.

### Summary

The nuclear sex was determined in 28 cases of severe male hypogonadism.

Only 6 patients, all with typical Klinefelter's syndrome, showed a discrepancy between phenotypic and nuclear sex.

Some aspects of the genesis of Klinefelter's syndrome are discussed.

Our thanks are due to Prof. C. Holten and Dr. Jacob E. Poulsen, who each contributed 1 case of Klinefelter's syndrome to our study.

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## PSYCHOPATHOLOGY OF KLINEFELTER'S SYNDROME

### REVIEW OF THIRTY-ONE CASES

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RENEWED interest in Klinefelter's syndrome has been aroused by the observation, in an appreciable number of cases, of chromatin bodies in the nuclei of biopsy specimens of skin, mucosal scrapings, and Leydig cells (Bradbury et al. 1956, Jackson et al. 1956, Plunkett and Barr 1956, Riis et al. 1956). These chromatin bodies most probably indicate the presence of the female chromosome pair XX; hence at least some patients with Klinefelter's syndrome may be genetically females, the syndrome constituting the counterpart of ovarian agenesis (*Lancet* 1956).

So revolutionary a conclusion needs further proof before it becomes widely accepted, especially since the sex chromatin has not been found in all cases of Klinefelter's syndrome (Briggs and Kupperman 1956).

The theory of a genetic origin of the syndrome is supported by the high incidence of mental deficiency in the cases which we review here, together with observations on their psychology and sexual behaviour.

References to the psychopathology of patients with Klinefelter's syndrome are scarce. Of the eight patients

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initially reported by Klinefelter et al. (1942) one was hysterical and of poor intelligence, and another had narcolepsy. Heller and Nelson (1945) observed in six of their twenty patients nervousness, irritability, depression, worrying, and loss of potency, which all disappeared with substitution therapy and were therefore regarded as climacteric manifestations. One case was described in an asylum patient with oligophrenia (Rosenblit 1949), and another was associated with "infantile psychism" (Ernould et al. 1952). Zūblin (1954), who made a special study of the psychology of six patients, observed a decrease in sexual drive in all of them, feeble-mindedness in two, lack of independence, indecision and changeable humour, poor and unstable vital impulse, and limitation of capacity for social adaptation. Zūblin (1954) and Bleuler (1954) consider that the psychopathology of Klinefelter's syndrome does not differ from that of other forms of testicular insufficiency, although Bleuler mentions that it would be convenient to investigate whether oligophrenia is more common in it than in other forms of sexual infantilism.

### Methods and Clinical Material

Thirty-one patients were studied. All were subjected to thorough clinical and genital examination. Testicular biopsy specimens, obtained in every case, were stained with hæmatoxylin and eosin, Sudan III, and Schultz reaction. Urinary gonadotrophins were determined by the method described by Klinefelter et al. (1943), and 17-ketosteroids by that of Holtorff and Koch (1940) slightly modified. Semen was analysed at least once in each case. The basal metabolic rate (B.M.R.) was determined and the sella turcica radiographed.

The patients were aged 14–50, twenty-one being aged 18–32 (table I). These included two boys aged 14, one aged 15, and two aged 16. Cases 19 and 25 were brothers.

Of the thirty-one patients twenty-one had Klinefelter's syndrome I—i.e., without eunuchoidism. The remaining ten had Klinefelter's syndrome II—i.e., with eunuchoidism, usually moderate. All were taller than average, sixteen being taller than 175 cm. (about 5 ft. 10 in.). The average height was higher among the eunuchoid group, especially in the adolescents. In the non-eunuchoid cases beard growth was normal, whereas in the other group eight patients had no beard and two had a very scanty growth. Gynæcomastia was present in nine patients with eunuchoidism and in seven without eunuchoidism. The size of the penis was normal, low normal, or small. The testes were small, measuring 10–33 mm. in their largest diameter; these measurements were taken with the orchimeter (Pasqualini 1956), which usually gives larger measurements than those found by palpation.

TABLE II—FAMILY PSYCHOPATHOLOGICAL ANTECEDENTS

*Case 2.*—Two feeble-minded brothers; nephew and cousin idiots; beardless uncle.
*Case 3.*—Feeble-minded paternal uncle.
*Case 6.*—Feeble-minded brother.
*Case 8.*—Feeble-minded mother; sterile maternal uncle.
*Case 9.*—Father died of general progressive paralysis; brother and maternal uncle feeble-minded.
*Case 10.*—Feeble-minded paternal cousin.
*Case 14.*—Insane paternal uncle.
*Case 15.*—Two maternal uncles and one paternal uncle committed suicide; uncle and two cousins feeble-minded.
*Case 16.*—Feeble-minded nephew.
*Case 17.*—Father with psychopathic personality.
*Case 19.*—Brother of case 25.
*Case 22.*—One feeble-minded brother.
*Case 25.*—Brother of case 19.
*Case 26.*—Feeble-minded paternal aunt; schizophrenic maternal cousin.
*Case 27.*—Feeble-minded maternal cousin.

### *Laboratory Investigations*

In each case microscopy of testicular material revealed the typical lesions of Klinefelter's syndrome—i.e., hyalinisation of the tubules, with progressive disappearance of germinal and Sertoli cells, and the characteristic alterations of Leydig cells (Sniffen et al. 1951).

Urinary gonadotrophins were determined in twenty-two cases, and, even though an optimal number of determinations could not be made, the results proved positive in every case (table I). In twelve cases the values were more than 48 mouse units a day, and in ten cases, although fewer determinations were made, the test for 6 units (highest urine dilution) produced maximal stimulation of the mouse uterus.

The 17-ketosteroids were determined in twenty-three cases (table I). Values greater than 9 mg. a day (lower normal limit in our laboratory) were found in nine of

TABLE I—ANALYSIS OF THIRTY-ONE CASES OF KLINEFELTER'S SYNDROME

| Case no. | Age (yr.) | Beard | Gynæcomastia | Size of penis | Size of testes (mm.) | Urinary gonadotrophins | Urinary 17-ketosteroids | Age at first masturbation (yr.) | Age at first coitus (yr.) | Sexual activity | Married | Raven's test | Wechsler's test | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | Verbal I.Q. | Non-verbal I.Q. | Full I.Q. |
| *Non-eunuchoids:* | | | | | | | | | | | | | | | |
| 1 | 21 | ++ | O | LN | 33 | >48 | 11·5 | 12 | .. | .. | No | V | 62 | 73 | *64* |
| 2 | 25 | + | +++ | LN | 15 | >60 | 5·1 | 16 | 17 | Low | No | .. | .. | .. | *67* |
| 3 | 21 | + | O | S | 21 | >96 | 16·4 | 15 | 21 | N | No | IV | 71 | 72 | *69* |
| 4 | 24 | ++ | O | N | 15 | .. | .. | 17 | .. | .. | No | IV– | 71 | 72 | *69* |
| 5 | 50 | ++ | O | S | 20 | .. | .. | 16 | 20 | Low | No | IV | 70 | 68 | *69* |
| 6 | 21 | ++ | O | LN | 25 | >96 | 13·5 | 11 | 13 | N | No | V | 72 | 77 | *72* |
| 7 | 21 | + | O | N | 10 | .. | 14·2 | 17 | 18 | N | No | IV– | 69 | 89 | *77* |
| 8 | 18 | + | O | LN | 20 | >6<96 | 5·4 | 14 | .. | .. | No | IV | 76 | 87 | *80* |
| 9 | 31 | +++ | +++ | S | 10 | >96 | 19·1 | 12 | 17 | N | Yes | V | 81 | 82 | *80* |
| 10 | 20 | ++ | + | N | 25 | >48 | 6·8 | 12 | 17 | Low | No | III– | 84 | 80 | *80* |
| 11 | 14 | O | ++ | N | 30 | <48 | 5·9 | 13 | .. | .. | No | III– | 82 | 80 | *81* |
| 12 | 16 | O | ++ | N | 29 | >48 | 14·2 | 14 | .. | .. | No | III– | 92 | 73 | *83* |
| 13 | 18 | + | + | N | 15 | >96 | .. | 12 | 15 | Low | No | III– | 87 | 89 | *85* |
| 14 | 32 | + | + | S | 20 | .. | .. | 8 | 10 | N | Yes | IV | 78 | 94 | *85* |
| 15 | 21 | ++ | O | LN | 10 | >96 | 9·9 | 16 | .. | .. | No | IV | 85 | 86 | *86* |
| 16 | 32 | +++ | ++ | LN | 20 | >96<192 | 8·9 | 12 | 15 | N | Yes | III– | 80 | 98 | *88* |
| 17 | 20 | ++ | O | N | 27 | .. | 12·7 | 13 | 16 | N | No | IV | 85 | 96 | *89* |
| 18 | 20 | ++ | O | N | 31 | <48 | 9·6 | 13 | 14 | N | No | IV | 93 | 89 | *90* |
| 19 | 16 | ++ | ++ | N | 25 | >6<96 | .. | 13 | 15 | N | No | III | 97 | 92 | *93* |
| 20 | 29 | +++ | + | N | 22 | .. | .. | 13 | 14 | N | Yes | IV+ | 94 | 105 | *98* |
| 21 | 33 | ++ | O | N | 15* | .. | .. | 12 | 15 | N | Yes | III | 94 | 110 | *105* |
| *Eunuchoids:* | | | | | | | | | | | | | | | |
| 22 | 20 | O | + | LN | 15 | >6<48 | 8·2 | 14 | .. | .. | No | V | 57 | 51 | *55* |
| 23 | 18 | O | + | S | 15* | .. | .. | 15 | 17 | Low | No | IV | 75 | 60 | *64* |
| 24 | 24 | O | O | S | 10 | >6 | 8·5 | 16 | .. | .. | No | IV– | 72 | 62 | *64* |
| 25 | 23 | + | O | S | 30 | <96 | 14·8 | 13 | 17 | N | No | IV | 77 | 80 | *78* |
| 26 | 14 | O | +++ | S | 30 | >48<96 | 5·8 | 12 | .. | .. | No | IV | 83 | 82 | *80* |
| 27 | 15 | O | ++ | N | 12 | .. | 10·8 | 12 | .. | .. | No | III– | 83 | 83 | *81* |
| 28 | 17 | O | ++ | N | 19 | >48 | 10·2 | 14 | .. | .. | No | .. | 83 | 87 | *87* |
| 29 | 31 | O | O | LN | 20 | >6 | 8·9 | 14 | 16 | Low | Yes | .. | 88 | 93 | *90* |
| 30 | 49 | + | +++ | S | 20 | >6 | 14·5 | 14 | 17 | Low | Yes | .. | 93 | 103 | *96* |
| 31 | 31 | O | ++ | LN | 15 | <96 | 22·6 | 11 | 18 | N | Yes | II | 107 | 108 | *105* |

LN, Low normal. S, Small. N, Normal. * Operated on for left cryptorchidism at age of 18 and 13.

fourteen cases without eunuchoidism and in five of nine cases with eunuchoidism.

All semen analyses revealed azoospermia.

The B.M.R. was normal (−10% to +10%) in ten cases; increased (+12% to +24%) in three cases; and decreased (−11% to −20%) in eight cases. However, no appreciable symptoms of either hyperthyroidism or hypothyroidism were observed, and there was no relation between a low B.M.R. and mental deficiency.

### Psychopathology

The psychopathological study was based on at least seven interviews per patient, in successive sessions. The patients were also seen by a psychologist (Mr. Pedro Rapela), who subjected them to Wechsler's test (intelligence scale) and Raven's and Rorschach's tests (Goodenough 1950). The examination included a detailed inquiry into the family background three generations back, including a total of two hundred and fifty persons.

Simultaneously, as a control, the same psychopathological study was made in twenty cases of hypogonadotrophic eunuchoidism, anorchia, castration, and cryptorchidism, and in twenty patients presenting sexual abnormalities with no organic basis (neurosis with alterations of the libido, and homosexuality).

Among the Klinefelter's syndrome group, in 15 families a moderate form of oligophrenia was observed, together with other mental anomalies (table II).

The patients, from an early age, had shown apathy, hypokinesia, timidity, and poor intelligence. The personality of the whole group showed homogeneous characteristics, with apathy and complete lack of initiative. Movements in general were slow and awkward. The patients were usually idle, tired easily, and slept too much; they had few vital interests; they were usually shy, restrained, had few friends, and were pusillanimous. In their tastes and diversions they resembled overgrown children.

As regards affective personality, Rorschach's test did not give answers M or C.

Most of the patients made a living by manual work and, although with some difficulty, all supported themselves economically, with satisfactory passive adaptation to their environment. Only two patients (cases 9 and 30) could be classified as neurotics with severe hypochondria. Three presented a psychopathic personality (cases 6, 18, and 29) showing erethism, insolence, and distrust.

The two neurotics were the only ones among the thirty-one patients who were aware of their disease. The others were not aware of their poor testicular development, even when confronted with their matrimonial sterility; one patient, who regularly used contraceptives, refused to abandon them when informed of his sterility (case 9).

As a contrast, the control patients with hypogonadotrophic eunuchoidism, anorchia, and castration included many neurotic and psychopathic symptoms with timidity, anxiety, hypochondria, and homosexual tendencies.

So far as intelligence is concerned, the anomalies were clearly objective. Of the thirty-one patients only five were within normal levels, with I.Q. (Wechsler) of more than 90 (table I); fifteen gave values lower than average; and eleven were definitely feeble-minded. Even in those who could be considered normal intelligence was simple and poorly differentiated. There was not a single one with intelligence above average, but there was no case of imbecility or of idiocy. Rorschach's test discovered a raised index of stereotypy and lack of original answers. Raven's test indicated poor capacity for observation, comparing, and reasoning by analogy (ranges III– and IV) (table I).

Wechsler's test showed the predominance of non-verbal I.Q. over verbal I.Q. (table I). The average full I.Q. of the whole group was 81, compared with 101 in twenty cases of hypogonadotrophic eunuchoidism, anorchia, castration, and cryptorchidism, and 112 in twenty cases of psychoneurosis and homosexuality. The patients of all three groups came from the same social environment and were seen alternately and in random order.

Among the twenty-one cases of Klinefelter's syndrome without eunuchoidism the average I.Q. was 81·4, and among the ten cases with eunuchoidism it was 80·3. The lowest I.Q. (55) was among the latter, and so was the highest (108).

Electro-encephalograms (Dr. Alfredo Thomson), obtained in eleven cases, were within normal.

### Sexual Behaviour

Sexual activity began at the habitual age (table I). 70% of the patients had had heterosexual relations by the age of 20. In only two cases were there homosexual experiences, and these were occasional.

Of the twenty-one patients *without eunuchoidism* fifteen had begun to have sexual relations at the usual age (table I) and maintained them at the time of the examination; four of these fifteen showed decreased libido and potency; the eleven others were normal in this respect. Of the six patients who had not begun to have sexual relations one was aged 14, another 16, and the others 18–24. All had started to masturbate between the ages of 8 years and 16. Five of the patients were married and maintained normal sexual activity.

Of the ten patients *with eunuchoidism* five had begun to have sexual relations between the ages of 16 and 18, but three of these had suffered a severe decrease in libido and potency; one of them (case 30) after having enjoyed normal sexual activity had lost it, requiring maintenance on testosterone. Three of these were married, with much decreased sexual drive in two of them. Two patients (cases 25 and 31) were capable of normal sexual relations notwithstanding considerable somatic eunuchoidism but with a satisfactory 17-ketosteroid excretion (14·8 and 22·6 mg. per twenty-four hours). Of the five patients who had not started sexual relations two were aged only 14 and 15, and all had erections, masturbated, and ejaculated, although a smaller amount than usual.

### Discussion

These observations lead to the conclusion that, in our cases of Klinefelter's syndrome, sexual drive was well-oriented, masturbation appeared at the usual period, and the maintenance of sexual intercourse was possible even in cases associated with eunuchoidism. On the other hand, even in cases without eunuchoidism, sexual activity was often diminished, even in young people.

The most significant finding was the high incidence of poor intelligence: of thirty-one patients only five reached a normal level of intelligence, fifteen were below normal, dull, or backward, and eleven were feeble-minded, in striking contrast to the controls.

This low intelligence quotient was not related to the degree of hypo-androgenism: it was the same in non-eunuchoid and eunuchoid patients. There was no correlation between I.Q. and urinary 17-ketosteroids.

This mental deficiency does not, of course, differ from that which is not accompanied by testicular lesions, but the picture is completed by the accompanying complete lack of initiative, interest, and vivacity, with slow awkward movements, and activity strictly limited to immediate interests including patients with normal or near-normal I.Q.

Irrespective of their I.Q., twenty-nine of these thirty-one patients were not aware of their disease, which fact is a finding of great interest.

The psychopathological differences between Klinefelter's syndrome and other forms of testicular insuffi-

ciency with severe hypo-androgenism are well marked and can be summarised as follows:

| *Klinefelter's syndrome* | *Hypogonadotrophic eunuchoidism, castration, and anorchia* |
|---|---|
| Well-oriented sexual drive. | Predominance of timidity; absence or great depression of sexual drive; homosexuality common. |
| Sexual activity normal or moderately depressed. | Impotence. |
| Unaware of their disease. | Well aware of their disease. |
| Good adaptation to social environment | Anxiety, hypochondria, and other neurotic symptoms; ill conduct common. |
| Endocrinological consultation through intermediaries or casual. | Early and spontaneous endocrinological consultation. |
| I.Q. below normal. | I.Q. normal. |

As regards the relationship between mental deficiency and testicular lesions, it seems improbable that one can be the consequence of the other, but the frequency of their association induces us to consider a common origin, which is undoubtedly genetic. A genetic origin is accepted for most forms of mental deficiency. So far as Klinefelter's syndrome is concerned, apart from previous strong presumptions about its embryonic origin, the finding of female sex-chromatin strengthens this possibility. On the other hand, the association of genetic lesions of the nervous system with gonadal disorders does not constitute a clinical novelty, the syndrome of Laurence-Moon-Biedl being a well-known example.

A minor proportion of cases of mental deficiency are undoubtedly of postnatal origin, and one cannot disregard the fact that some cases of Klinefelter's syndrome are the consequence of unknown factors acting between birth and puberty; in these cases the association of mental and testicular lesions would be most improbable. This postnatal origin would explain the lack of sex-chromatin and the presence of male-type gametogenesis (Bunge and Bradbury 1956).

There are still some unknown facts and unconfirmed hypotheses making it difficult to elucidate the pathogenesis of Klinefelter's syndrome; hence much is to be learnt by subjecting more cases to a complete study. This should be quite feasible since this syndrome is much more common than is usually thought, for in six years we observed forty-five cases of Klinefelter's syndrome and only twenty-five cases of hypo-androgenic eunuchoidism.

### Summary

Thirty-one cases of Klinefelter's syndrome were studied from a psychopathological point of view. There were twenty-one cases without eunuchoidism and ten with eunuchoidism.

The most significant observation was a low I.Q., averaging only 82, compared with 101 in twenty cases of hypogonadotrophic eunuchoidism, castration, and anorchia, and 112 in twenty cases of homosexuality and sexual neurosis.

Of the thirty-one patients studied only five had a normal I.Q.; fifteen were below normal, and eleven were feeble-minded.

There were no psychopathological differences between the cases with and those without eunuchoidism, or any parallelism between the I.Q. and the values of urinary 17-ketosteroids.

Sexual activity began at the usual age. 70% of the non-eunuchoid group had sexual intercourse, with decreased sexual activity in four of fifteen. Half of the eunuchoid group maintained sexual relations, but activity was depressed in three of five.

It is concluded that in Klinefelter's syndrome, mental deficiency and testicular lesions have a common genetic origin.

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# KLINEFELTER'S SYNDROME
## FREQUENCY AND TESTICULAR MORPHOLOGY IN RELATION TO NUCLEAR SEX

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SYSTEMATIC study of the patients attending the male infertility clinic at this hospital has disclosed an unexpectedly large proportion of cases in Klinefelter's syndrome. A detailed study of these cases is in progress, but in view of the very great interest being taken in this subject at present, we think it worth presenting, in a preliminary form, some of the results already available.

Attention has recently (Plunkett and Barr 1956, Bradbury and Bunge 1956) been concentrated upon those cases of Klinefelter's syndrome (Klinefelter et al. 1942) in which the nuclear sex is female. By using a simple technique of nuclear sexing we can, however, distinguish a chromatin-positive (with female nuclear sex) Klinefelter's syndrome and a chromatin-negative (with male nuclear sex) Klinefelter's syndrome. We have been chiefly concerned to demonstrate that there is a substantial difference between the two forms, particularly in respect of the testicular morphology.

### Frequency

During the years 1955 and 1956, 831 patients attended the male infertility clinic at the Western Infirmary, Glasgow, and 758 (91·2%) of these produced a seminal specimen for analysis. 332 of these had a sperm count below 40 million per ml.; complete absence of sperm was found in 50 cases and in 76 cases the sperm count was below 1 million per ml. All the 126 patients in these two latter categories of high-grade subfertility were asked to attend for oral mucosal smear, and this was obtained in 91 cases (72%). Examination of the nuclei of the oral mucosa by the method of Moore and Barr (1955) revealed that 10 cases (6 of total azoospermia, 4 of extreme oligospermia) were chromatin-positive, or, in other words, appeared to be genetic females, and investigation showed that they were all cases of Klinefelter's syndrome. If we can assume that our sample of 72% is an unbiased one—and we have no reason to suppose that it is not—we can conclude that chromatin-positive Klinefelter's syndrome is responsible for 11% of cases of high-grade subfertility in males.

Determination of the frequency of chromatin-negative Klinefelter's syndrome is less easy, for there is no suitable

### PROF. PASQUALINI AND OTHERS: REFERENCES—*continued*

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screening test. Of the 91 cases of high-grade subfertility, clinical examination suggested that 27 (30%) were cases of Klinefelter's syndrome. Testicular biopsy and endocrine assays in all cases in which they have been done have confirmed the clinical diagnoses and we therefore think these diagnoses can be regarded as reliable. All our chromatin-positive cases were included: the remaining 17 were chromatin-negative.

Testicular biopsies were performed on 68 patients attending the male infertility clinic during the same two-year period. All these patients were included in the high-grade subfertility group, and 6 were found to be examples of chromatin-positive Klinefelter's syndrome, whilst 8 were histologically clearly cases of Klinefelter's syndrome but were chromatin-negative. Assuming that this series of testicular biopsies is unbiased in favour of either form of the syndrome—again a reasonable assumption—we may conclude that approximately 40% of cases of Klinefelter's syndrome are chromatin-positive. This agrees closely with the clinical findings outlined above.

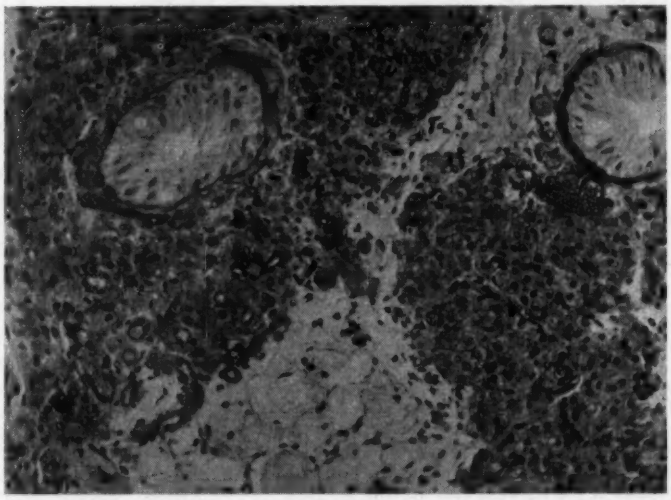

Fig. 2—Testis in Klinefelter's syndrome (chromatin-positive). Clumped atypical Leydig cells, "ghost tubules" (lower centre), and scanty Sertoli-cell-lined tubules. (Masson. ×125.)

It would appear, then, from our series, an unselected one, that Klinefelter's syndrome is a most important cause of high-grade subfertility in males. Even if we assume that there are no cases of the syndrome among patients with sperm counts above 1 million per ml. (whom we have not included in the present investigation) 8·5% of all our cases of male oligospermia of any degree are examples of the syndrome. Probably many cases, both chromatin-positive and chromatin-negative, go undiagnosed. We now know of at least 19 chromatin-positive cases in Glasgow alone.

### Testicular Histology

Study of testicular biopsies has made it clear that descriptions of testicular histology in Klinefelter's syndrome need revision: for the picture in chromatin-negative and chromatin-positive cases is altogether different. Both show a prominent overgrowth of interstitial (Leydig) cells combined with marked tubular underactivity, but there the resemblance ends. In chromatin-negative cases (fig. 1) the interstitial cells are diffusely increased and their cytology remains normal. A large proportion of the seminiferous tubules approximate to the normal size, but most are lined solely by Sertoli cells; in all cases a few tubules show some spermatogenesis; relatively few are represented only by a distorted and swollen hyaline membrane, the "ghost tubules," which are typical of both forms of this syndrome. There is usually no gradation between the "ghost tubules" and those lined by Sertoli cells. In chromatin-positive cases (fig. 2) the interstitial cells are aggregated into massive discrete well-vascularised clumps, and individually show marked nuclear pleomorphism. Large areas appear to be devoid of tubules and of the small number present by far the majority are "ghost tubules"; the remainder are of small size, appear immature, are lined by Sertoli cells which infrequently show vacuolation, often have no lumen, and may be partially hyalinised. Spermatogenesis (Bunge and Bradbury 1956) is rare, and in the two chromatin-positive cases which show this feature it is confined to single tubules; one case showing spermatocytes, the other spermatogonia only.

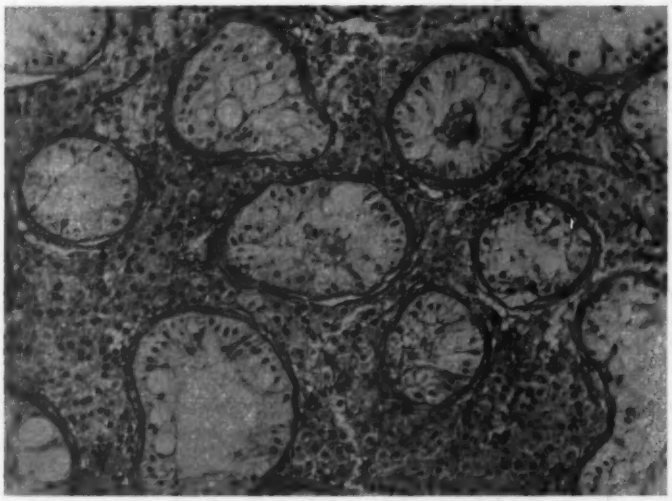

Fig. 1—Testis in Klinefelter's syndrome (chromatin-negative). Diffuse Leydig-cell hyperplasia, numerous tubules lined by Sertoli cells. (Masson. ×125.)

The differences between the two forms are such that we have found it possible in all cases to predict the nuclear sex on cursory examination of a testicular biopsy section with a low-power lens.

### Clinical Features

The only completely constant feature on physical examination in all our cases has been micro-orchidism; the presence of small firm testes is of great diagnostic value. Gynæcomastia has been seen in 6 of our chromatin-positive cases, and in only 1 of our chromatin-negative cases; this is the most significant clinical difference we have yet noticed between the two forms of the syndrome.

### Conclusions

Discussions of the nature of the gonadal change in Klinefelter's syndrome have

been based on the assumption that the gonads are alike in the two forms of the condition. This is not so. The difference of the gonad in the chromatin-positive (female) cases from the normal testes is more profound than has been recognised. They in fact have some resemblance to the organs produced by exposing the ovary to abnormal environments, as in the freemartin (Lillie 1917), and it may well be that the gonad in these cases can be regarded as a modified ovary and not a testis in origin. We hope to be able to present further evidence in this direction by study of ovaries modified by various experimental methods. This may well provide a basis for an explanation of the occurrence of Klinefelter's syndrome in genetic females alternative to that recently propounded by Danon and Sachs (1957).

### Summary

Study of the material of a male infertility clinic indicates that 8·5% of all cases of male subfertility and 30% of cases with major impairment are due to Klinefelter's syndrome.

40% of cases of Klinefelter's syndrome and 3% of all subfertile patients attending our male infertility clinic are genetic females according to the results of nuclear sexing.

There are profound histological differences between the gonads in chromatin-positive and chromatin-negative cases.

We have to thank Mr. G. Kerr for the photomicrographs.

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# FAMILIAL SPASTIC PARAPLEGIA

## ITS RELATION TO MENTAL AND CARDIAC ABNORMALITIES

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DURING a recent survey in the North of Scotland (Sutherland 1956) three brothers were referred as possibly having multiple sclerosis. Further consideration, however, of the clinical findings and family history suggested that the diagnosis was familial spastic paraplegia. The family is now reported because features of general interest and importance emerge, and because the tendency to diagnose sporadic cases of heredofamilial neurological disease as multiple sclerosis is exemplified.

### The Patients

The three brothers presented with spastic paraplegia and either subjective or objective evidence of optic-nerve disease. Apart from increased tendon-reflexes signs of pyramidal damage were not apparent in the upper limbs. Slight cerebellar dysfunction existed in two patients, and in one vibration sensibility was impaired in the legs. Each patient had bilateral pes-cavus deformity. The principal findings are summarised in the accompanying table; the following additional investigations in each patient revealed no abnormality: radiography of skull and chest, fluoroscopy of heart, analysis of gastric contents, hæmatological examination, and Wassermann reactions of blood and cerebrospinal fluid (C.S.F.).

SUMMARY OF FINDINGS; 3 PATIENTS WITH FAMILIAL SPASTIC PARAPLEGIA

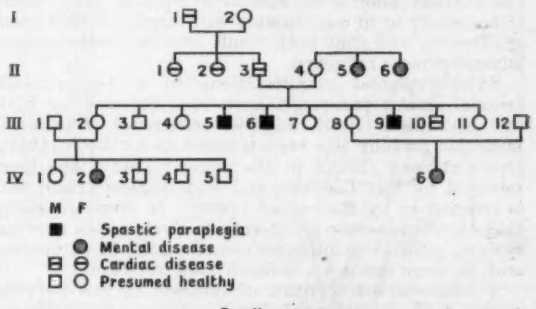
| — | III 5 | III 6 | III 9 |
|---|---|---|---|
| Present age (yr.) | 38 | 37 | 32 |
| Age at onset (yr.) | 21 | 26 | 24 |
| Early symptoms | Each patient complained of either weakness or stiffness of both legs | | |
| Course .. .. | Gradual and progressive impairment of motor function | | |
| Locomotor system | Slight pes cavus | Slight pes cavus | Severe pes cavus |
| Optic fundi .. | Slight pallor of lt. disc | Bilateral optic atrophy | Bilateral optic atrophy |
| Visual acuity .. | Normal | R6/36 : L6/24 | R6/60 : L6/36 |
| Visual fields .. | Full | Concentric constriction | Concentric constriction with loss of left upper temporal quadrant |
| Cerebellar function | No impairment | "Scanning" speech, horizontal nystagmus | Action tremor of left arm |
| Mental state .. | Euphoric | Mental deterioration | Mental deterioration |
| Tone of legs .. | Severe spasticity | Severe spasticity | Severe spasticity |
| Power of legs .. | Slight impairment | Slight impairment | Slight impairment |
| Tendon-reflexes | Exaggerated | Exaggerated | Exaggerated |
| Abdominal reflexes | Absent | Absent | Absent |
| Plantar responses | Extensor (2) | Extensor (2) | Extensor (2) |
| Sensation .. | Normal | Normal | Vibration sense diminished in legs |
| Control of sphincters | Precipitancy and incontinence of urine | Precipitancy and incontinence of urine | Normal |
| C.S.F. protein (mg. per 100 ml.) | 52 | 24 | 64 |
| Colloidal-gold test of C.S.F. | Negative | Negative | 0001220000 |
| Cardiogram .. | Rt. axis deviation, rt. ventricular preponderance | Intraventricular conducting system defect | Intraventricular block, attacks of paroxysmal ventricular tachycardia |

In 1953–55, when these patients were under observation, there was slight but definite impairment of mental function. In two a general dulling of intellect was associated with obsessional trends; in the third the prevailing mood was frank euphoria. In two of the patients control of the urinary bladder became impaired, precipitant micturition being associated with occasional incontinence.

### Family History

The pedigree, so far as it could be traced, is shown in the accompanying figure. No close parental consanguinity was found, but the parents (II 3 and 4) of generation III were probably distantly related. The only members of the family to have spastic paraplegia are the brothers III 5, 6, and 9.

*Heart-disease.*—A history of heart-disease culminating in sudden death at an early age was obtained in male members of generations I (I 1) and II (II 1, 2, and 3). Electrocardiographic evidence of heart-disease was found in the patients with familial spastic paraplegia (III 5, 6, and 9), and a further brother (III 10), aged 28, in whom




Family tree.

no evidence of neurological disease was detected, had an abnormal electrocardiogram indicating intraventricular block with episodes of multiple ventricular extrasystoles, as did III 9.

*Mental Illness.*—Several female members of generations II and IV had mental illness. In II 5 and 6 it appears to have been presenile dementia, but further details are lacking. The mental changes in the three brothers with spastic paraplegia have already been mentioned; and of the fourteen children in generation IV one (IV 2) is a mongol and another (IV 6) an idiot. The other children are apparently healthy at present and are not included in the figure.

## Discussion

Although the heredofamilial neurological diseases may be classified according to predominant clinical features, it seems probable that the "classical" conditions—e.g., Friedreich's ataxia, the cerebellar ataxias, and familial spastic paraplegia—are but different expressions of the same disease. Schut (1950), for example, described a family in which Friedreich's ataxia, cerebellar ataxia, and familial spastic paraplegia occurred in different members, and Landau and Gitt (1951) reported a family in which a similar variation in the pattern of lesions was observed. It is therefore not surprising that other workers have referred to intermediate forms of the disease, thus strengthening the contention of Bickerstaff (1950) that "the same process possibly altered by modifying genes or by environment is capable of producing a series of closely related clinical syndromes."

The present report indicates that cardiac and mental disease may occur either in association with the neurological syndrome or singly in other members of the family. All three disabilities, mental, neurological, and cardiac, were observed in the three brothers who formed the basis of this report. Occurring singly, cardiac disease was discovered on the male side of the family and mental deterioration on the distaff side.

The occurrence of heart-disease in Friedreich's ataxia is well established. In 38 cases reported by Evans and Wright (1942) electrocardiography revealed significant abnormalities in 12 patients and slight abnormalities in 10 others. Similarly Roth (1948) reported a high incidence of cardiac disease in a family in which Friedreich's ataxia, peroneal muscular atrophy, and intermediate forms of heredofamilial neurological disease occurred. The present report and the work of Manning (1950) favour the view that, in some instances, the cardiac manifestations may occur in the absence of clinically apparent neurological disease.

Worster-Drought et al. (1940, 1944) reported a form of familial presenile dementia with spastic paraplegia, and the occurrence of mental instability in a family with Friedreich's ataxia is alluded to by Pfändler (1947). In the present pedigree, in addition to the mental changes noted in the three brothers with spastic paraplegia, mental disease has occurred in female members of two other generations. It therefore appears that, as with the cardiac anomalies, mental symptoms may occur either singly or in combination with organic neurological syndromes, and that both result from a closely related adverse genetic influence.

Extrapyramidal manifestations in a family with familial spastic paraplegia have been reported by Dick and Stevenson (1953), and the occurrence of peroneal muscular atrophy has been referred to by Roth (1948). Optic atrophy (found in the present study) has been reported by Van Leeuwen and Van Bogaert (1949) and is referred to by Bickerstaff (1950). It therefore seems that the disease may affect various levels of the nervous system, producing different combinations of symptoms and, in some instances, isolated manifestations.

A characteristic feature of diseases of the nervous system is the similarity of clinical signs in many different chronic pathological processes, and it is widely acknowledged that the protean manifestations of heredofamilial neurological disease may cause difficulty in diagnosis. Of considerable importance in this respect is the tendency for sporadic cases of hereditary ataxia to be mistaken for multiple sclerosis. The reports of Ferguson and Critchley (1929) and Fryer and Taverner (1953) exemplify the close clinical similarity between these two conditions, and the distinction is rendered more difficult by the fact that multiple sclerosis may not uncommonly affect more than one member of a family (Pratt 1951).

A further difficulty is occasioned by the tendency of multiple sclerosis to develop in neuropathic "soil" (Curtius 1933, Curtius and Speer 1937). Thus Pfändler (1947) has reported a patient with multiple sclerosis who had a family background of Friedreich's ataxia, epilepsy, and suicide, and Brouwer (1933) found at necropsy changes of both Friedreich's ataxia and multiple sclerosis in one of two sisters suspected of having Friedreich's ataxia.

I have not been able to trace any published reports suggesting that cardiac abnormalities occur with significant frequency in multiple sclerosis, nor do my own observations favour such a view. The frequent occurrence, therefore, of abnormal electrocardiograms in the heredofamilial ataxias suggests that the electrocardiogram may have a value second only to examination of the C.S.F. (Pratt et al. 1951) in differentiating between this disease and multiple sclerosis when this is impossible on clinical grounds alone.

## Summary

A family is reported in which three siblings had spastic paraplegia, mental deterioration, and heart-disease.

Mental disease and heart-disease were found separately in other members of the family.

The manifestations of heredofamilial neurological disease are discussed, and the occasional difficulty in distinguishing these syndromes from multiple sclerosis is emphasised.

It is a pleasure to thank Dr. J. Ronald and Dr. J. C. R. Greig for granting me facilities to investigate the cases of familial spastic paraplegia, and Prof. J. H. Tyrer for helpful advice and criticism. I am grateful to Dr. P. A. Macleod for assistance in eliciting the family history.

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". . . The only way in which a child learns that fire burns is by getting burnt. Until his first burn he is incapable of understanding what burning means, but one would not advocate sitting every infant on top of a red-hot stove as soon as he is born; it is our business rather to see to it that his first burn shall be incurred in circumstances in which it will convey a maximum of information with a minimum of damage. This same principle applies to the whole field of social and emotional experience. The large Victorian family with its inner circle of siblings and its outer circle of uncles, aunts, cousins and grandparents provided an excellent microcosm of Society in which expanding experience was tempered by family tolerance. . . . It is, however, no use sighing for the past. It is better to consider how we can make positive use of the nursery, the nursery school and the school in fostering adjustment."—J. D. KERSHAW, *Publ. Hlth, Lond.* July, 1957, p. 135.

# HYPOTHERMIA BELOW 10°C IN DOGS
## WITH CARDIAC RECOVERY ON REWARMING

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INDUCED hypothermia has lately proved of much value in operations on the heart, great vessels, and brain, but the danger of ventricular fibrillation has prevented the reduction of deep body-temperature below 26–28°C in adult patients. In laboratory animals much lower temperatures can be reached, depending on the species.

Burton and Edholm (1955) say that the adults of non-hibernating species can be cooled to 14–20°C, and in the dog Bigelow et al. (1950) recorded temperatures of 15°C without ventricular fibrillation, which usually begins in dogs at higher temperatures. Smith (1954) and Smith et al. (1956), in their classic experiments on hamsters, achieved deep body-temperatures below 0°C with survival, by cooling under conditions of hypercapnia, and Niazi and Lewis (1954) recorded similar results in rats. Swan et al. (1953), on the other hand, have

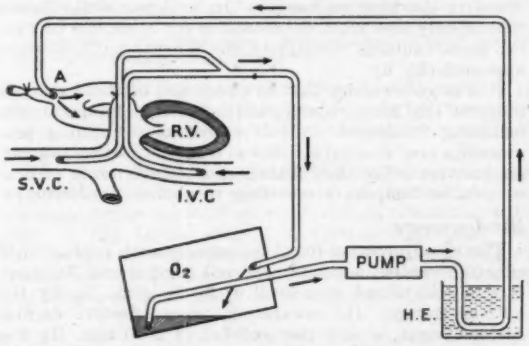


**Fig. 1—Diagram of extracorporeal circulation. A.= aorta ; R.V.=right ventricle ; S.V.C.=superior vena cava ; I.V.C=inferior vena cava; $O_2$=oxygenator ; H.E.=heat exchanger.**

reduced the incidence of ventricular fibrillation in dogs by lowering the $CO_2$ tension by hyperventilation.

It occurred to us that if, during the cooling and rewarming phases, the demand on cardiac output could be reduced by an extracorporeal by-pass circulation, ventricular fibrillation might be averted, permitting cooling to near 0°C. Moreover, the artificial maintenance of high blood-flow would allow rapid mass cooling and rewarming.

We report preliminary results obtained by this method.

### Methods

Mongrel dogs were used, of an average weight of 15 kg. Anæsthesia was induced with intravenous sodium thiopentone, the average total dosage during an experiment being 0·75 g. After intubation, ventilation with air under positive pressure was maintained with a respiration-pump. A femoral artery and vein were cannulated, the former to record blood-pressure and the latter to permit slow saline infusion for intravenous thiopentone and heparin. The chest was opened by a transverse incision and the left subclavian artery dissected above the aortic arch for a distance of 3 cm. The right auricle was exposed through a pericardial incision and two tapes were passed extra-pericardially to include the superior vena cava and azygos veins, and the inferior vena cava. Heparin 3 mg. per kg. body-weight was given intravenously. The subclavian artery was ligated distally and a cannula inserted proximally close to the aortic arch. Two wide-bore venous catheters were inserted through the right auricular appendage, manipulated to lie one in each vena cava, and retained with a purse-string suture in the appendage.

A Melrose extracorporeal pump-oxygenator was used, primed with dextran and with a heat exchanger incorporated in the output circuit. The venous catheters led through a Y-connection to a wide-bore 'Tygon' tube, syphoning blood into the oxygenator by a gravity fall of 15 cm. The blood was oxygenated with an atmosphere of 95% $O_2$, 5% $CO_2$ in the rotating drum, then pumped through the heat exchanger and returned to the aorta under pressure (fig. 1). The volume of blood in the oxygenator was maintained at a constant level by varying the output to match the venous inflow under different experimental conditions.

With the heart still beating, the extracorporeal by-pass circulation was begun and hypothermia induced by reducing the temperature of the heat exchanger. Additional surface-cooling was provided by means of ice bags. When the required fall in body-temperature was achieved, the animal was rewarmed by raising the temperature of the heat exchanger, and on completion the extracorporeal by-pass was discontinued and the venous catheters removed.

Body-temperatures were recorded throughout the experiment with mercury-glass thermometers, one placed in the region of the porta hepatis through a separate small abdominal incision, which was later sutured, and a second inserted 6–8 cm. in the rectum. Electrocardiograms (E.C.G.), blood-pressure, and by-pass-circulation output were recorded throughout the experiment.

### Results

*Temperature*

In the initial experiment, the hepatic temperature was reduced to only 17°C, but in six subsequent experiments temperatures of 4·7–7°C were attained. At low temperatures the rectal temperature lagged behind the hepatic temperature, but this difference did not exceed

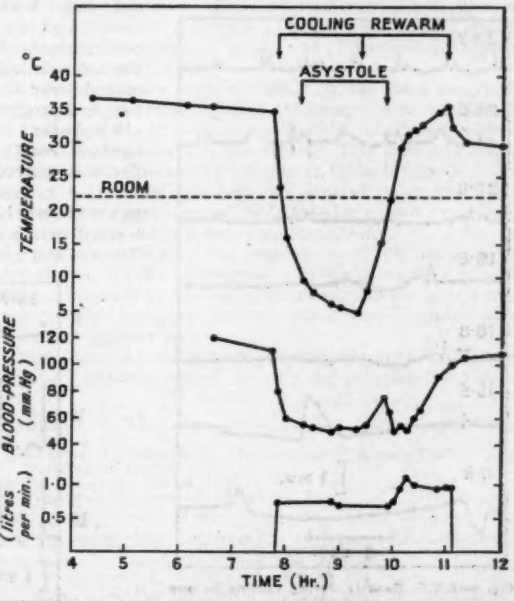


**Fig. 2—Cooling and rewarming curve with high by-pass output. Temp.=temperature in porta hepatis ; M.B.P.=mean blood-pressure ; E.C.C. = extracorporeal circulation by-pass.**

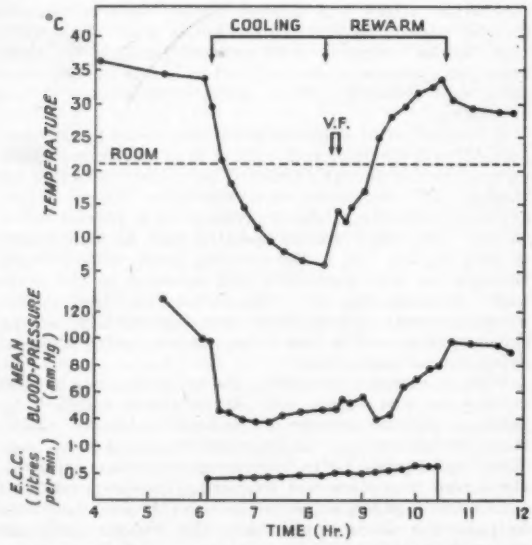


Fig. 3—Cooling and rewarming curve with short period of ventricular fibrillation (V.F.) due to too rapid initial rewarming.

2°C. A greater gradient was observed if the rectal thermometer was partially withdrawn. The time needed for cooling to the lowest point varied from 50 to 100 minutes, and for rewarming to 32–35°C from 75 to 120 minutes. The more rapid rates of cooling and rewarming were achieved by improvements in the heat exchanger and by maintaining a greater rate of flow in the by-pass circuit. When the cardiac by-pass was discontinued, the temperature fell by 3–4°C. Typical cooling and rewarming curves are shown in figs. 2 and 3.

*Heart*

Over the temperature-range of 37°C to 18–22°C, the heart-rate bore a straight-line relation to temperature during both cooling and rewarming. As the animals were cooled over this range, a progressive defect in cardiac conduction was observed on the E.C.G., manifest by broadening of P waves and QRS complexes, and increasingly long P–R intervals. The Q–T interval became greatly lengthened.

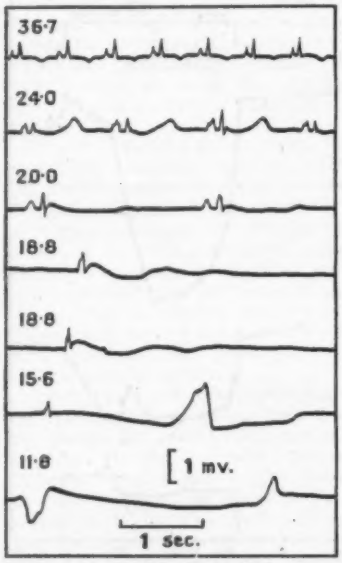


Fig. 4—E.C.G. (lead I) during cooling in one experiment. Horizontal bar = 1 sec.; vertical bar = 1 mV; hepatic temperatures (°C).

Below a temperature of 15–20°C, any of a number of events were seen: complete electrical asystole; persistent P waves with no QRS complexes; regular ventricular complexes with retrograde excitation of auricle (fig. 4, 18·8°C); complete disappearance of P waves with regular ventricular complexes, sometimes followed by a sinusoidal recovery phase; ventricular fibrillation. Which of these changes appeared in any one animal seemed to depend to some extent on the output of the cardiac by-pass—in cases where a high output was maintained asystole resulted, but fibrillation during cooling was seen only once, during a phase of very low by-pass output. When the output was increased the fibrillation was abolished.

In the rewarming phase, the sequence of events was usually simpler. P waves reappeared at about 10°C but without ventricular complexes. At a degree or so higher, the normal sequence of conduction was re-established, and as the temperature rose the most notable changes were the increase in heart-rate and progressive shortening of conduction-times and Q–T interval, till a near-normal pattern was regained (fig. 5). In two cases ventricular fibrillation appeared at the beginning of the rewarming phase associated with arrival of a sudden wave of warm blood into the circulation from too-sudden heating of blood in the heat exchanger. In both cases fibrillation was rapidly abolished by recooling for a minute or two. On more cautious rewarming the normal E.C.G. pattern appeared (fig. 6).

It was noteworthy that in every one of these animals (despite the E.C.G. abnormalities at low temperatures, including fibrillation in two cases) as rewarming progressed a near-normal E.C.G. was regained, with no special manœuvres other than maintaining an adequate cardiac by-pass or temporary recooling to abolish fibrillation.

*Blood-pressure*

The blood-pressure (B.P.) fell rapidly with cooling until effective cardiac asystole occurred (figs. 2 and 3), when it was maintained at a level of 30–50 mm. Hg by the by-pass pump. On rewarming, when effective cardiac systole began, a slow rise and fall of 2–10 mm. Hg was observed, coinciding with ventricular systole. From this point the mean B.P. steadily rose to 90–110 mm. Hg when rewarming was complete. By permitting the heart gradually to take over the whole circulation, the B.P. was well maintained after discontinuing the by-pass. In two early experiments the by-pass was cut off suddenly, resulting in a fall to 60–70 mm. Hg, and requiring intra-arterial infusion to restore a satisfactory level.

## Discussion

We wish to emphasise that this is a preliminary communication and that the technique described and results

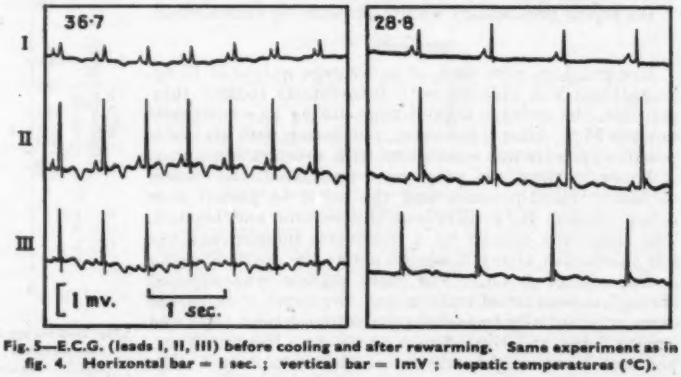


Fig. 5—E.C.G. (leads I, II, III) before cooling and after rewarming. Same experiment as in fig. 4. Horizontal bar = 1 sec.; vertical bar = 1mV; hepatic temperatures (°C).

obtained in a small series of animals will need confirmation. The concept of an extracorporeal circulation in action for periods of 2–3 hr. at outputs of 20–60 ml. per kg. per min. will need further review, though preliminary results on hæmolysis under these conditions are not discouraging. It would be desirable to reduce the period of extracorporeal circulation, but rewarming in the lower temperature-ranges must necessarily be cautious in view of the easily induced ventricular fibrillation.

The temperature drop of 4–5°C, after discontinuing the extracorporeal circulation, levelled off, probably indicating that metabolism had recommenced. The severity of the drop may be partially explained by the open thoracotomy and anæmia, the final hæmatocrits being in the region of 25%.

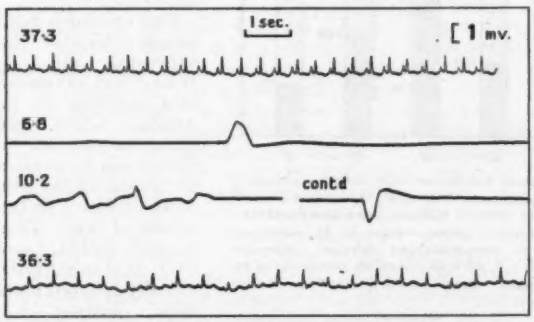


**Fig. 6—E.C.G. (lead I) in another experiment. From above down: before cooling; after cooling; fibrillation during rewarming, ended by recooling; after rewarming; horizontal bar = 1 sec.; vertical bar = 1 mV; hepatic temperatures (°C).**

The most remarkable observation in this small series of experiments is the consistency of the results; on cooling, cardiac asystole occurred, and on rewarming with care in the initial stages, a normal heart-beat and satisfactory B.P. were restored. In the two cases in which ventricular fibrillation arose, it was easily reversible by recooling and more cautious rewarming.

### Summary

An extracorporeal cardiac by-pass technique is described. A pump oxygenator and heat exchanger were used to induce low hypothermia.

In six experiments on dogs, deep body-temperatures of 4·7–7°C were achieved, and after rewarming, and discontinuing the by-pass, cardiac function was satisfactory.

Ventricular fibrillation was observed in two experiments. In one this was associated with a low by-pass-output during cooling and disappeared when this was increased. It also appeared in these two experiments in the initial phase of rewarming, owing to sudden increase in temperature of the heat exchanger. This was easily converted to sinus rhythm by a short period of recooling.

Cardiac asystole was effective in the lower temperature-ranges.

We are indebted to Prof. C. G. Rob for his valuable advice and encouragement in planning and completing this experimental series; to Mr. R. D. S. Thomson and Mr. N. R. A. Trickey for voluntary technical assistance; and to Mr. W. E. McGuire and Mr. S. J. Spereall, A.M. (MAR.) E., for valuable technical assistance with the apparatus. One of us (J. R. K.) acknowledges a financial grant from the St. Mary's Hospital endowment fund, which has made this investigation possible.

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## Preliminary Communication

### HÆMOCHROMATOSIS, AFRICAN NUTRITIONAL SIDEROSIS, AND EXPERIMENTAL SIDEROSIS IN ANIMALS

SEVERAL matters arising from a leading article [1] on the Liver in Hæmochromatosis merit comment, especially in the light of our recent researches in Durban.[2] According to this article:

(1) "The present weight of evidence is against the view that the iron deposits are alone responsible for the hepatic damage in hæmochromatosis."

(2) "The hæmosiderosis which results" [from iron overload] "is said to differ in many ways from hæmochromatosis."

As regards the former statement, we wish to report that, of 100 liver biopsies, done in Durban on African males suspected of having liver disease, distinct siderosis was found in 88. In 10 cases moderate to severe portal fibrosis (as distinct from cirrhosis) was found to be unassociated with portal siderosis—i.e., without accumulation of iron in portal phagocytes.

Thus, portal fibrosis *can* occur in the African in the absence of portal siderosis. On the other hand, of 24 cases with severe portal siderosis the portal fibrosis was graded as severe in 22 and moderate in the remaining 2. The correlation between the degree of portal fibrosis and portal siderosis in our cases was shown by the $\chi^2$ test to be statistically significant ($P<0.01$). Moreover frank portal *cirrhosis* (gross architectural distortion) was found in 37 patients, in 31 of whom siderosis was advanced; portal cirrhosis was not found in any patient whose liver was not siderotic. The incidence of portal cirrhosis was significantly higher ($P<0.01$) in those with advanced hepatic siderosis. This latter relationship appeared to be independent of the ages of the patients.

Further, in the same series of patients there was also a statistically significant correlation between the type-III stage of hepatic siderosis (classification of Gillman and Gillman [3]) and the incidence of testicular atrophy ($P<0.01$). This is in conformity with the findings of Nissim,[4] who reported on the frequency of testicular atrophy in rats subjected to long-continued treatment with iron *by injection*. Rather [5] confirmed this finding in rats *fed* excessive amounts of iron, over long periods, together with either "good" or "protein-deficient" diets.

Thus it appears that, certainly in the later stages of siderosis in the malnourished African, the accumulation of iron, either directly or indirectly, produces disease at least in the liver and the testes. This does not imply that iron accumulations operate independently of other factors. On the contrary, we believe that there are numerous endogenous and undoubtedly potent exogenous factors (such as chronic malnutrition), at least in the African, affecting the reactivity of all the connective tissues to the pathogenic actions of various stimuli and particularly to macromolecules such as the ubiquitous iron-protein complex in our cases (see Gillman and Gillman,[3] chapter 29).

However, the failure of experimentalists to induce hepatic cirrhosis, either in rats or in rabbits, despite

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2. Gillman, T. Ciba Colloquia on Ageing. London, 1957; vol. 3, pp. 104, 188.
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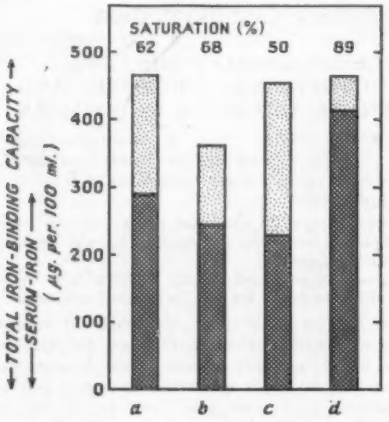


Fig. 1—Mean values for serum-iron, total iron-binding capacity, and saturation % in rats fed: *a*, Purina (stock) diet; *b*, Purina + 2% ferric citrate; *c*, corn-grit diet; *d*, corn-grit + 2% ferric citrate (from data of Kinney et al.[13]). Figures at top of each column represent saturation of total iron-binding capacity (%).

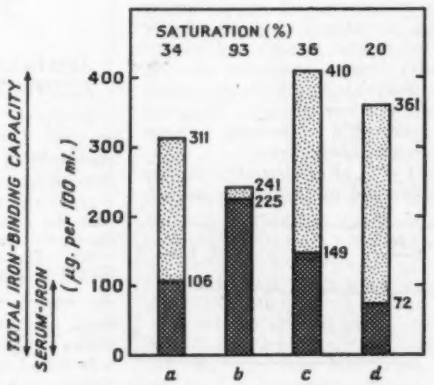


Fig. 2—Mean values for serum-iron, total iron-binding capacity and saturation % in man: *a*, normal males[11] (our values for normal subjects were comparable); *b*, hæmochromatosis (mean values in 21 published cases[14–16]); *c*, uncomplicated African siderotics (present study); *d*, African siderotics complicated by chronic infection, hepatic failure and carcinoma (present study).

prolonged and severe iron overloading of the tissues either by feeding or injecting this element,[5] may well be due to differences either in the vascular arrangements[6] and/or in the reactivity of the livers of the animals hitherto used in this work. On the other hand, this failure to produce cirrhosis, or even hepatic fibrosis, in heavily siderotic laboratory animals may also be due to basic differences in the underlying nutritional metabolic disturbance produced in rats, mice, and rabbits, compared with that found in the African. This brings us to the second statement in the leader quoted above.

On the basis of the evidence available *hitherto* we disagree with the view, maintained by some, that human nutritional siderosis "... differs in *many* ways"-from idiopathic hæmochromatosis. However, we have recently elicited evidence indicating that it may now be possible, for the first time, to distinguish, on biochemical grounds in the living subject, between idiopathic hæmochromatosis in Europeans and nutritional siderosis in Africans.

Gillman and Gillman[3] have repeatedly maintained that, although the incidence of diabetes in, and the age and sex distributions of, nutritional siderosis in the African differ from those in European hæmochromatosis, these two diseases *cannot* easily be distinguished *on histopathological* grounds. This view was later substantiated by J. H. Sheldon after looking at the Gillmans' African material in 1948. Higginson et al.,[7] on the other hand, subsequently claimed to be able to distinguish sharply between nutritional siderosis in the African and idiopathic hæmochromatosis in Europeans, both from the histologically determined relative distribution of iron in the reticulo-endothelial as opposed to parenchymal cells, and especially on the basis of the chemically determined iron content of the spleen. Review of their data reveals their conclusions to be based primarily on post-mortem material from African hospital inpatients, many of whom died of acute or chronic infections or from debilitating diseases. We now have indications that acute and chronic infections can and do profoundly alter the relative distribution of iron between hepatic parenchymal and reticulo-endothelial cells in nutritional siderosis.

In our view, therefore, the findings of Higginson et al. probably cannot be regarded as reflecting correctly the basic nature, and certainly not the pathogenesis, of nutritional siderosis in the African. Nor can their findings be directly compared with the relatively uncomplicated active disease, in its various stages studied with the aid of liver biopsies in the living.[2 3]

This opinion is maintained despite that expressed also by Walker and Arvidsson[8] that siderosis in the African differs from hæmochromatosis in that it can be explained, purely on the basis of an excessive dietary intake of iron. Those workers stated, moreover, that other nutritionally induced metabolic changes, considered by Gillman and Gillman[3] to play a basic part in the pathogenesis of siderosis in Africans, need *not* be invoked to account for this disease. They attributed the markedly raised serum-iron levels reported in the African both by Squires[9] and by Gerritsen and Walker[10] *entirely* to a dietary overload of iron. The available data on plasma-iron levels in animals and man do not conform with this interpretation.

The plasma-iron state is usually assessed according to the plasma-iron level, the total iron-binding capacity of the plasma, and the degree of saturation of the iron-carrying potential of the plasma. This aspect of iron metabolism has been extensively reviewed by several workers.[11 12] Although a good deal is known about changes in the plasma-iron levels in anæmias, hæmochromatosis, and transfusional siderosis, data relating to *nutritional* siderosis, in either man or animals, are scanty. Critical examination of the admittedly limited data reported by Kinney et al.[13] relating to the effects of a dietary overload of iron in rats (cited by Walker and Arvidsson[8] in support of their views) discloses that nutritional siderosis in rats differs in at least one respect from nutritional siderosis in Africans. Fig. 1, based on the data of Kinney et al.[13] shows that the serum-iron saturation can be changed, by dietary overload of iron, to different degrees on "good" compared with "corn-grit" diets.

Although the serum-iron level rose and the serum-iron saturation as well as the iron content of the livers increased considerably in rats fed on corn-grits plus iron supplements (fig. 1*d*), the total iron-binding capacities were not increased above the control value (cf. fig. 1*d* with 1*a*).

The serum-iron findings in fig. 1*d* resemble those described in idiopathic hæmochromatosis (cf. fig. 1*d* with fig. 2*b*) but differ strikingly from those found by us in African siderotics (cf. fig. 1*d* with fig. 2*c*). Thus, we determined the plasma-iron levels in 29 male Africans in all of whom the presence of uncomplicated siderosis was established by combined clinical and biopsy studies. In most of them both the plasma-iron level and the

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total iron-binding capacity of the plasma were above the upper limits of normal (cf. fig. 2*a* with fig. 2*c*). In consequence of the rise of *both* these values the plasma saturation exceeded 50% in only 2 cases (mean saturation 36%), even though the plasma-iron levels were above the upper limits of normal in more than half of our cases (cf. fig. 2*a* with fig. 2*c*).

These plasma-iron studies in our cases confirm those of Gerritsen and Walker,[10] who attributed their findings solely to dietary overload of iron. To our knowledge, neither they nor Walker and Arvidsson [8] have since correlated these biochemical data with the state of the liver. However, careful comparisons of the changes in the plasma-iron levels with the extent and severity of the hepatic siderosis in each of our cases leaves little doubt that some metabolic upset, revealed by a rise both of plasma-iron and of iron-binding capacity, occurs early in this disease. In fact, in cases not complicated by infections or by hepatic failure (cf. fig. 2*a* with fig. 2*d*) these biochemical findings are almost as diagnostic of the underlying pathology in nutritional siderosis as is the different plasma-iron picture recorded for idiopathic hæmochromatosis [14–16] (cf. fig. 2*a* with fig. 2*b*). Whether the unusually high total iron binding capacity of the plasma, so frequent in our cases and in the African material reported on by Gerritsen and Walker, is a function of the invariably elevated plasma-globulins in the African siderotic still requires to be determined. It is of interest in this regard, however, to note that Dr. J. Powell has recently informed us that comparison of the plasma-proteins estimated by paper electrophoresis in 100 Africans (50 hospitalised and 50 "healthy" controls) with 25 Europeans revealed no statistically significant difference in the β-globulin levels. Dr. S. M. Joubert, also of this school, has conducted more extensive comparative paper-electrophoresis studies of plasma-proteins in 200 "healthy" African males (between the ages of 16 and 40 years), 50 Indian males, and 50 Europeans (males and females) of the same age-group. He kindly informed us that he found the β-globulin values in the Africans to be 8% higher, on the average, than those in both his European and Indian subjects—not a marked difference. These findings are of special interest to our problem in virtue of the widely held view that iron is transported in the plasma combined with that β-globulin fraction referred to as "transferrin."

Our findings seem to provide the first indication of the existence of a specific metabolic distinction between nutritional siderosis in the African, experimental siderosis in animals, and idiopathic hæmochromatosis in Europeans. In addition, our biochemical data, taken in conjunction with those of Gerritsen and Walker,[10] also seem to substantiate the contention, originally made by Gillman and Gillman,[2] that some metabolic disorder (possibly nutritionally conditioned) probably underlies and precedes the massive uptake of dietary iron and the consequent severe siderosis so often found in Africans not only in Johannesburg but, as we have now shown, also in Durban.

Thus, apart from providing evidence that, at least in the African, severe long-standing siderosis of the tissues may perhaps be actively pathogenic, our observations also disclose distinct metabolic differences, between experimental siderosis in rats, idiopathic hæmochromatosis in Europeans, and nutritional siderosis in Africans.

The work is still being actively prosecuted by our group on the appallingly abundant African siderotics in Durban, where at least 400–500 severe cases are admitted annually to this hospital alone. We hope soon to study the more subtle aspects of iron metabolism in this disease with the aid of radioactive isotopes since we are now convinced that only with such methods can the basic derangements underlying African siderosis be *factually* resolved.

We would like here to thank Dr. S. Disler, hospital superintendent; Prof. E. B. Adams, director of the division of medicine; Dr. J. Kelman Drummond, Dr. R. Pooler, and Dr. F. J. Davidson for access to their cases; Dr. A. Beemer for necropsy material; and Dr. M. B. Mackenzie for clinical assistance.

ADDENDUM

While the above was in the press Wainwright [17] published plasma-iron findings in 50 Africans. The differences between his values and ours, especially his low total iron binding capacities, have now been shown by us (as by Peters et al.[18] and Joubert [19]) to be due to the somewhat unsatisfactory method for total iron binding capacity used by him yielding low values. Nevertheless our findings and his agree in that: (1) plasma-iron values in *uncomplicated* African siderotics are frequently elevated and saturation rarely, if ever, approaches that in European hæmochromatotics; (2) in the presence of infection or hepatic failure plasma-iron values may be low in the presence of considerable hepatic siderosis.

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17. Wainwright, J. *S. Afr. J. Lab. clin. Med.* 1957, **3**, 1.
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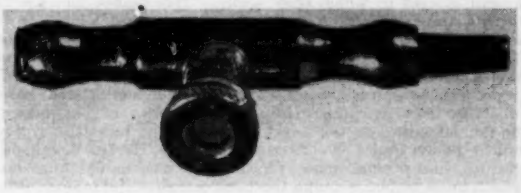
19. Joubert, S. M. Personal communication.

## New Inventions

### A NEW CONNECTOR FOR REPEATED INJECTIONS INTO TRANSFUSIONS

INTRAVENOUS therapy often involves the injection of multiple doses of one or more drugs, and it is common practice to inject these through the tubing of a transfusion apparatus. These injections cause perforations, which become painfully obvious when pressure is applied, which may in fact render the use of pressure impossible when it is most needed, which introduce the danger of air-embolism, and which will cause the tubing to be discarded by the blood-transfusion service as unfit for reissue.

The connector here shown has been designed to permit multiple injections through a Gordh type of rubber



diaphragm without damage to the transfusion apparatus. It is tapered male and female Luer to coincide with standard National Blood Transfusion Service fittings, and an olive is turned at each end to allow for its insertion into rubber or plastic tubing if necessary. It can be sterilised by dry heat at 150°C for one hour.

The connector may be obtained from Blease Anæsthetic Equipment Limited, 12, Hinde Street, Manchester Square, London, W.1. I am indebted to Mr. R. Reece for the prototypes and to Mr. L. Mincher for the photograph.

HARRY MIDDLETON
F.F.A. R.C.S.

The Plastic Surgery, Burns and Jaw Injuries Centre, St. Lawrence Hospital, Chepstow, Mon

# Reviews of Books

## Human Disease

A. E. CLARK-KENNEDY, M.A., M.D. Camb., F.R.C.P., physician to the London Hospital. Harmondsworth: Penguin Books. 1957. Pp. 260. 3s. 6d.

IN the 1951 Festival of Britain, the inside of the Dome of Discovery was as dim as Barcelona Cathedral—a reminder of the possible dangers of scientists making their subjects seem mysterious and forbidding. In medicine this obscurantism is often defended on the ground that the public should not be thinking about disease and may easily misunderstand what they are told. But in the long run it is a mistake to present medicine as a great mystery, meaningless to the uninitiated, and there is therefore a place for a book giving a short, accurate, unsensational account of human illness. In setting out to provide one, Dr. Clark-Kennedy has not been deterred by the obvious and appalling difficulties of compressing his subject into one stalwart "Pelican" and of writing for those without knowledge of the basic sciences.

After an outline of physiology, in which he disposes of several metaphysical systems for good measure, he goes on to describe diseases in terms of reaction to injury —i.e., on an ætiological classification. There are chapters on the "not yet understood" and on mental disorders; and one on methods of clinical diagnosis. All this is done suitably for the layman in that the style is easy and the descriptions are neither euphemistic nor blood-curdling. But, though in these respects the standard is very high, the book is so full of technical facts that one cannot imagine those untrained in medicine absorbing it readily. (Many of the technical words used—epiphysis, anoxæmia, bronchus, ectoderm, symphysis—are not explained in text or glossary.) On the other hand, the medical student who wants to keep the wood as well as the trees in view might find it very useful (none the less so because it contains some distinctly questionable statements which ought to keep his critical faculties alert); and when, in years to come, he faces a patient's anxious questions, he could turn to it again for help in the difficult task of explanation.

## Physical Methods in Physiology

W. T. CATTON, M.SC., physiology department, King's College, Newcastle upon Tyne. London: Sir Isaac Pitman & Sons. 1957. Pp. 375. 42s.

THIS account of physical methods in physiology will be very useful to the laboratory worker and teacher since it deals specifically with physiological problems, as contrasted with medical ones which have been considered in other larger works.

The methods are grouped under the heading of the physiological system to which they apply. This makes for ease in finding the information required. Some physiological facts are combined with physical considerations, making for intelligibility. At the end of each chapter a fair number of useful references is given. The systems dealt with are blood, circulation, respiration, muscle, peripheral nerve, the basis of body-heat exchanges, and electronics in physiology. In the introduction the author says that he has deliberately omitted such topics as electrocardiography, electro-encephalography, and special sense physiology—reasonable omissions which have helped to make the book compact and manageable.

Even those who already know many of the physical methods which can be applied to physiology may find that this book brings other possibilities to their notice.

## An Introduction to Blood Group Serology

KATHLEEN E. BOORMAN, senior scientific officer, South London Blood Transfusion Centre; BARBARA E. DODD, PH.D., lecturer in forensic medicine, London Hospital Medical College. London: J. & A. Churchill. 1957. Pp. 317. 40s.

This essentially practical handbook gives details of no less than 100 techniques covering everything that is done in routine or in exceptional work in a blood-transfusion centre. There is a minimum of explanatory theory. Both practice and theory are notably clear and we can well believe that the candidate for a certificate in hæmatology of the Institute of Medical Laboratory Technology will find in this book everything he needs to know. For those who work in general laboratories a selection of the contents of the book has been specially listed to form a "shortened version," which gives all the information needed to carry out efficiently and safely the blood-transfusion techniques that can reasonably be expected of a routine laboratory.

There is nothing new in this book and the section on the collection of blood and its delivery to the patient takes no account of recent techniques using plastic or silicone materials. The omission of superfluous photographs, like those of the Seitz filter and the aspiration of plasma, and less mathematics, such as the calculation of gene frequencies, might have enabled the price to be kept down. Technicians and resident pathologists would then have been encouraged to buy their own copies: the laboratory bench is its natural home.

## Atlas of Tumors of the Nervous System

H. M. ZIMMERMAN, M.D., chief, laboratory division, Montefiore Hospital, professor of pathology, college of physicians and surgeons, Columbia University, New York City; MARTIN G. NETSKY, M.D., associate neuropathologist and associate attending physician in neuropsychiatry, Montefiore Hospital; LEO M. DAVIDOFF, M.D., attending neurological surgeon, Montefiore Hospital, professor and chairman, department of surgery, Albert Einstein College of Medicine, New York City. London: Henry Kimpton. 1956. Pp. 191. £9.

THE illustrations in this pleasing atlas have been carefully selected. The most interesting (and the most helpful) are the reproductions of artists' drawings. The authors' purpose is to give pathologists and others interested in this subject a partial substitute for material which they may not be able to examine directly. The text is short but, for a superficial survey of space-occupying lesions, it is adequate. The Bailey and Cushing classification is preferred to that of Kernohan and his colleagues, one of the reasons being that the Kernohan classification "implies prophetic capacities on the part of the pathologist which is often not fulfilled by the clinical outcome."

There are many who would benefit from a study of this atlas, so we hope that the better-endowed libraries will be able to afford a copy. The number of excellent coloured photomicrographs is presumably responsible for the high cost. Some would-be buyers may turn sadly away wondering whether the cost of colour in this kind of book is really justified by the improvement over black-and-white pictures.

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**New and Nonofficial Remedies** (Philadelphia: J. B. Lippincott. London: Pitman Medical Publishing Company. 1957. Pp. 570. 30s.).—The new *N.N.R.* contains 42 new monographs on drugs of all kinds ranging from new cough-suppressants to drugs used in the chemotherapy of cancer, many of which are familiar. As usual, it provides a helpful critical summary of drugs which are used but have not yet reached the pharmacopœias. It appears under the ægis of the A.M.A.'s Council on Pharmacy and Chemistry.

**Developmental Abnormalities of the Eye** (2nd ed. London: British Medical Association. 1957. Pp. 419. 90s.).—In this new edition Miss Ida Mann has used her profound knowledge of the embryology and comparative anatomy of the eye to interpret the clinical facts of ocular developmental anomalies. The descriptions of these defects and disorders are much enlivened by her critical examination of the hypotheses concerning the way in which they have arisen, and, above all, by her interesting opinions about their probable cause. Her enthusiastic correlation of different types of developmental anomalies with the various stages of development in which they originated makes a fascinating narrative. There are chapters on the deformities of the skull involving the orbit, abnormalities affecting the eye as a whole, and abnormalities of the fundus, the iris, lens, cornea, conjunctiva and sclera, lids, lacrimal apparatus, and orbital contents. There is also a chapter on the management of patients with congenital abnormalities. The book is admirably written and the illustrations are excellent, though perhaps the pictures of the morbid histology of glioma (neuroblastoma) retinæ could have been bettered and a fundus picture of this neoplasm might be included in the next edition. A large bibliography completes an attractively produced book.

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*LONDON: SATURDAY, JULY 27, 1957*

## Antibiotic Combinations

IN a recent critical assessment of the value of mixtures of antibiotics, DOWLING [1] identified five possible advantages, one or more of which might be claimed for each mixture. The possible advantages could be summarised as (1) synergism; (2) reduced toxicity; (3) prevention or delay in the appearance of resistant organisms; (4) broad cover for mixed infections; and (5) suitable treatment for seriously ill patients before a bacteriological diagnosis could be made. In DOWLING's view, synergism has often been claimed as a property of some particular combination upon evidence which exaggerates the accuracy and reproducibility of biological experiments and rests upon the demonstrably fallacious assumption that antibacterial activity and weight of drug have a linear relationship. The rate at which a combination of drugs kills bacteria is the in-vitro test, which bears the best relation to clinical results; but synergism is often held to be established by performance in growth-inhibition tests—a very different matter. In clinical practice, as DOWLING emphasised, "synergism means a therapeutic effect obtained with two or more drugs that could not be obtained with either drug alone in full therapeutic doses, or a lower case-fatality rate in a group of cases when two or more antibiotics are used than when either drug is used alone." In this category he recognised the use of penicillin with streptomycin for endocarditis caused by the enterococcus (*Streptococcus fæcalis*); streptomycin with a tetracycline or chloramphenicol for brucellosis; and penicillin with chlortetracycline or streptomycin with oxytetracycline for staphylococcal endocarditis. Among other published claims, he found that synergism was reasonably well proved in two cases only—streptomycin with erythromycin for a case of staphylococcal endocarditis, and penicillin with bacitracin for a case of diphtheroid endocarditis. Regarding the claims made by ENGLISH et al.[2] for a synergic action of oleandomycin and tetracycline in a ratio 1 : 2 ('Sigmamycin'), GARROD [3] repeated the tests but did not confirm the results, and DOWLING remarked that a fourfold or greater enhancement of growth inhibition (the least that he could regard as significant) was observed in only 7 of 28 strains and that no statement was made about how many strains were examined in which such an effect was not observed. Animal experiments with three strains of *Staphylococcus aureus* and one of *Strep. pyogenes* provided evidence which DOWLING regarded as suggestive enough to warrant further investigation. The interpretation of this type of animal experiment in terms of human infection is very uncertain, however, because dosage proportions that are synergistic in animals may be indifferent or even antagonistic in man.

In the matter of reduced toxicity, it now appears from the work of WIER et al.[4] that streptomycin alone is less likely to cause deafness than the combination of streptomycin and dihydrostreptomycin. Although streptomycin alone is more likely to cause vestibular damage than is the combination, deafness is so much more important that the non-toxicity claimed for the combination is now in doubt. To prevent the appearance of resistant organisms in tuberculosis it is certainly necessary to give more than one drug, but it is still uncertain whether the use of a combination of antibiotics for other infections is really justified, and DOWLING gave reasons for thinking that, in this respect, the treatment of tuberculosis might remain exceptional. For mixed infections, DOWLING thought that the few justifiable combinations were poorly absorbed antibiotics (polymyxin and neomycin, for example) for intestinal antisepsis and penicillin and streptomycin for peritonitis. For these purposes he preferred that the drugs should be given separately in order to ensure administration of the best dose of each drug. For both these mixed infections, he affirmed, single antibiotics were often as satisfactory and might be superior. Mixtures of bacitracin and polymyxin B might be applied locally to infections of the skin. The undiagnosed serious infection needed above all a careful clinical assessment. If this led to the conclusion that more than one antibiotic was needed, each should be given in the dose that would be best for it if used alone. On the whole, then, DOWLING considered that only a few highly selected conditions required combinations of antibiotics, although their use has been advocated in other conditions in which they would either do no good or do actual harm.

Another approach to measuring the possible synergism or antagonism of antibiotic combinations was made by JONES and FINLAND,[5–7] who titrated the antibacterial activity of the plasma of normal human subjects at intervals after they had had various antibiotics either singly or in pairs in the same doses. Their results led them to think that the apparent antagonism between erythromycin and penicillin was probably due to differences in the absorption of the various dosage forms of erythromycin, together with differences in activity of oral preparations of penicillins V and G. They could find no method of combining oleandomycin and penicillin G that enhanced their activity. With tetracycline and penicillin V titrated as described against streptococci and pneumococci, penicillin V always yielded the highest peak level, tetracycline the lowest, and the combination an intermediate value. The same conclusion was reached if total anti-streptococcal activity was estimated for 24 hours. For total anti-pneumococcal activity, however, tetracycline came out best. In all observa-

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2. English, A. R., McBride, T. J., Halsema, G. Van Carlozzi, M. *Antibiot. Chemother.* 1956, **6**, 511.
3. Garrod, L. P. *Brit. med. J.* July 13, 1957, p. 57
4. Wier, J. A., Storey, P. B., Curry, F. J., Schless, J. M. *Dis. Chest*, 1956, **30**, 628.
5. Jones, W. F., Finland, M. *New Engl. J. Med.* 1957, **256**, 869.
6. Jones, W. F., Finland, M. *Ibid*, 1956, **255**, 1019.
7. Jones, W. F., Finland, M. *Ibid*, 1957, **256**, 115.

tions the combination gave lower levels of antibacterial activity than the better of the two drugs given alone. It is of interest that, using the tube-dilution method for measuring the growth-inhibiting power of various antibiotics against gram-negative bacilli, WAISBREN and STRELITZER [8] found that the popular combination of streptomycin and penicillin was surprisingly ineffective against these particular organisms.

Altogether, it is hard to escape the conclusion that antibiotic combinations were insufficiently studied and assessed before they were introduced to clinical practice. One of the most disturbing features of the fashion for antibiotic combinations is that it may, if pursued unwisely, give dangerous entry to weak erythromycin-like drugs—drugs which are too ineffective for use in serious infections like meningitis but which, as GARROD [3] has proved, carry some risk of introducing erythromycin-resistant staphylococci to hospitals previously free from this particular menace to the great value of a life-saving drug. We see every reason to agree with DOWLING that the only valid proof of clinical synergism is its unequivocal demonstration by means of adequately controlled clinical studies in human infections. Admittedly such trials are hard to organise, but they are not impossible, and the issues are important enough to demand them. Meanwhile, we hope that every doctor who may have occasion to prescribe an antibiotic combination will carefully examine and assess the evidence before he does so.

## Meconium

MECONIUM, so called by ARISTOTLE, apparently owes its name to an ancient belief that it kept the fœtus asleep in utero. The idea that it consists largely of the debris of shed cells dies hard, but biochemical studies [9 10] show it to be composed mainly of mucus secreted by the intestinal glands. The chief components are mucopolysaccharides with strong blood-group activity; other components include digestive enzymes (which the fœtus secretes long before birth), light yellow "meconium bodies," swallowed epithelial squames, and debris. The absence of squames is used in FARBER'S [11] test for failure of patency of the alimentary tract in congenital atresia; but EMERY [12] found that a few squames were in fact present in the meconium in four cases of atresia, and the theoretical basis of the test must be suspect. The test is of little practical value, for the question facing the clinician is usually not whether atresia is present, but whether obstruction is present through this or some other cause.

Meconium ileus has become well recognised as a form of neonatal intestinal obstruction specifically associated with fibrocystic disease (mucoviscidosis), in which the secretion of the mucus glands of the body in general is abnormally viscid. BUCHANAN and RAPOPORT [10] showed that the inspissated meconium contains a lot of mucoprotein instead of mucopolysaccharide, and GLANZMANN described [13] a test based on the presence of this abnormal mucoprotein.

8. Waisbren, B. A., Strelitzer, C. L. *Arch. intern. Med.* 1957, **99**, 744.
9. Rapoport, S., Buchanan, D. J. *Science*, 1950, **112**, 150.
10. Buchanan, D. J., Rapoport, S. *Pediatrics*, 1952, **9**, 304.
11. Farber, S. *J. Amer. med. Ass.* 1933, **100**, 1753.
12. Emery, J. L. *Arch. Dis. Childh.* 1952, **27**, 67.
13. Glanzmann, E., Berger, H. *Ann. paediat.* 1950, **166**, 289.

HIATT and WILSON [14] first reported success in the surgical treatment of meconium ileus; and GROSS et al.[15] have described a series of successful cases followed up for several years, demonstrating the fortunate fact that severe alimentary mucosis, leading to meconium ileus, is not necessarily associated with other severe manifestations of mucoviscidosis—the pancreatic and lung changes may be mild.

But not every intestinal obstruction of the newborn is due to meconium ileus of this nature. EMERY [16] and ZACHARY [17] describe two other syndromes, one easily managed and one uniformly fatal. A mass of colourless meconium usually fills the lower rectum, and this *Mekoniumpfropf* is passed at the beginning of the first meconium stool. Occasionally it may form an "anorectal plug," and this leads to obstruction and failure to pass meconium. Digital examination of the rectum, alone or followed by a washout, will bring away the plug and normal defæcation follows with no further trouble. The plug contains much less water than the normal meconium and has a raised surface tension; EMERY attributes these changes to absorption of water consequent on delayed passage of the plug. Such dried-out segments of meconium have been observed also in other parts of the bowel. The more serious condition EMERY and ZACHARY describe as "fæcal plugs." Babies present with this condition at 4 days to 5 weeks of age, and may have passed normal meconium before evidence of obstruction arises. Yellowish hard masses of fæces block the colon; and even a proximal colostomy is not always enough to prevent stercoral ulceration, proceeding to perforation and death from peritonitis. Perhaps such firm masses should be removed at operation. Particular care would seem to be needed when a newborn infant with what looks like Hirschsprung's disease is found at laparotomy to have very hard fæcal masses in the colon. The underlying cause of the fæcal plugs is not known—the intramural nerve-plexuses were normal in all cases—but again the material contained less water than does normal meconium and had a higher surface tension. EMERY suggests that the primary trouble may be an upset in the balance of water absorption and propulsion.

Besides these two syndromes, EMERY describes unusual clusters of large yellow meconium bodies. These may be big enough to distort the gut, and have been found also in association with congenital atresia. They have never been shown to cause postnatal obstruction, but he suggests that they may cause fœtal obstruction or volvulus or both, and hence lead to atresia. This would be in keeping with NIXON'S [18] revival of the suggestion that jejuno-ileal atresia is often due to an embryologically late accident to preformed bowel.

It is noteworthy that these obstructing syndromes other than meconium ileus are suspected of having a physical cause—undue drying of the material—rather than a chemical one as has mucoviscidosis. But the cause of the delay in passage or increase in water absorption remains a mystery.

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15. Schwachman, H., Pryles, C. V., Gross, R. E. *Amer. J. Dis. Child.* 1956, **91**, 223.
16. Emery, J. L. *Arch. Dis. Childh.* 1957, **32**, 17.
17. Zachary, R. B. *Ibid*, p. 22.
18. Nixon, H. H. *Gr. Ormond St. J.* 1956, **11**, 1.

# Annotations

## TESTS OF RENAL FUNCTION

KIDNEY function may be impaired in three principal ways: the renal plasma-flow may be reduced, the glomerulus may be damaged, or tubule function may be deranged. Most renal diseases include each of these disorders, but to different degrees. In essential hypertension the chief fault is reduction in renal plasma-flow, although tubule function is also early disturbed; but the glomerular filtration-rate is well maintained. In acute glomerulonephritis and its sequelæ the main effect is reduction in glomerular filtration-rate, whereas renal plasma-flow and tubule function are disturbed only later. In the nephrotic syndrome the basic fault is probably increased glomerular permeability,[1] sometimes with increased glomerular filtration-rate [2 3] and possibly disturbed tubule function [4] but with well-preserved renal plasma-flow; whereas in pyelonephritis tubule function is early affected, followed closely by renal plasma-flow, with glomerular filtration-rate continuing almost normally.[5] Of course, in the later stages all three elements are disturbed in all renal diseases and it is often impossible to establish, even after death, the underlying disease process. For this reason tests of individual kidney functions have been harshly judged in some quarters, whereas in others obloquy has been no less pronounced, but on different grounds—namely, that they are cumbersome, inexact, and difficult to interpret. Certainly they provide no short cut to anatomical or ætiological diagnoses; and certainly they must be conducted under standard conditions of exercise, diet, and hydration.[6] But used and interpreted intelligently they aid diagnosis and decisions on treatment.[7]

Kark et al.[8 9] have studied the diffuse renal disease of systemic lupus erythematosus by percutaneous renal biopsy, and related the histological changes in the kidneys with a series of simple tests of function, conducted concurrently. These were specific gravity, proteinuria, urine sediment, nitrogenous blood constituents, urea-clearance, and phenolsulphthalein excretion—all tests in daily use in the U.S.A. and (except the phenolsulphthalein test, at the moment unwarrantedly unfashionable) in this country. Their first, and least surprising, conclusion is that tests of renal function are generally insensitive. Because of the large reserve of renal tissue, considerable structural change can take place before measurable functional damage becomes apparent. This might be interpreted as an argument for the more frequent use of renal biopsy. Their second conclusion—that proteinuria is a measure of damage in the glomerular basement membrane—might also have been predicted, but it is good to have this point confirmed. The further observation that proteinuria is related to histological changes in the tubule should be interpreted cautiously; there are good grounds for believing that these changes may sometimes be secondary to the proteinuria itself. Specific gravity was found to relate equally well with glomerular, tubular, and overall kidney damage; but if abnormal it was a good index of kidney disease. In view of this and other data [10–12] it should not be taken as an unequivocal test of tubule function. Studies of the urinary sediment showed that in general the number of casts increased with increasing kidney damage. But hyaline casts are probably a reflection of proteinuria, and cellular and granular casts of tubule desquamation; so if no distinction is made between them no specific relationships can be expected, and none are reported.

The urea-clearance has been generally accepted as a test of glomerular filtration-rate, and the phenolsulphthalein excretion as a measure of renal tubule excretory function, but Kark et al. show that impaired excretion of these two substances is related to overall kidney damage rather than to individual derangements. The blood-creatinine, blood-urea-nitrogen, and blood-protein-nitrogen were measured in most of the patients studied, and usually all were raised when extensive renal damage was apparent histologically. But distinct cellular changes could be observed without nitrogen retention, which must be relegated to a lowly position as an index of advanced and widespread disease.

In these cases of systemic lupus erythematosus renal biopsy provided earlier and more exact and useful information on diagnosis and progress, and indicated treatment more precisely, than any of the indirect tests of renal function. This work casts some doubt on the specificity of the urea-clearance and phenolsulphthalein excretion as tests of principally glomerular disease and tubular disease respectively when the kidney is widely diseased. It is tempting to extend the results to other forms of renal disease, but this would probably be unjustifiable. The recent clear demonstration [13] of the fundamental glomerular lesion of acute glomerulonephritis and its sequelæ indicates that this disease may offer a better model for comparison of structural and functional changes than one in which both elements are concurrently disturbed early. It is to be hoped that Kark and his associates will soon report their data on pyelonephritis and glomerulonephritis in similar fashion.

## SEROLOGICAL DIAGNOSIS OF GLANDULAR FEVER

THE serological diagnosis of glandular fever depends on identifying specific heterogenetic antibodies, which may be agglutinating or hæmolytic.

An agglutinin, active against sheep cells, was described by Paul and Bunnell [14]; this agglutinin is also active against horse cells.[15] A second type of agglutinin is active against human group-O erythrocytes sensitised by bacteriophage lysates of certain staphylococci and hæmolytic streptococci [16]; such lysates contain a common hapten which is adsorbed to the red cell. A third type is active against human erythrocytes sensitised by exposure to egg cultures of Newcastle-disease virus [17]; this is thought to be a hapten adsorption phenomenon, but its relationship to the bacterial type of hapten is obscure.

Hæmolytic antibodies, active against sheep cells, but more active against ox cells, were first described by Bailey and Raffel.[18]

The classical serological method of diagnosing glandular fever is the original Paul-Bunnell sheep-cell agglutination test. But Messer [19] has lately advocated a rapid one-stage test in which agglutination of sheep cells, and neutralisation with ox-cell and guineapig extracts, are done simultaneously; the result can be read after only an hour. The identification of ox-cell hæmolysins was advocated by Mason [20] and Leyton,[21] who found that ox-cell lysin could exist in significant titre sometimes before, and sometimes without, the development of sheep-cell agglutinin. The hæmolysin is not removed by sheep cells, and is presumably a distinct entity. Because complement is used and cell suspensions are variable, this is a more complex

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2. Farr, L. E. *Ibid*, 1936, **15**, 703.
3. Galan, E. *Amer. J. Dis. Child.* 1949, **77**, 328.
4. See *Lancet*, 1957, i, 1288.
5. Smith, H. The Kidney. New York, 1951; p. 876.
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15. Barrett, A. M., *J. Hyg., Camb.* 1941, **41**, 330.
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19. Messer, A. I. *J. clin. Path.* 1957, **10**, 23.
20. Mason, J. K. *J. Hyg., Camb.* 1951, **49**, 471.
21. Leyton, G. B. *J. clin. Path.* 1952, **5**, 324.

procedure than agglutination. An advantage is that other heterogenetic antibodies do not interfere with the reaction.

By any method of serological diagnosis, a rising titre is more significant than an isolated reading. Titres can vary widely with slight alterations in technique; but a sheep-cell-agglutinin titre of over 1 in 30,[15] and a hæmolysin titre to ox cells of over 1 in 40,[21] are diagnostic in most cases.

## ENDOCRINE TRANSPLANTATION

IT is well known that homotransplants, except of cornea, cartilage, and blood-vessels, do not survive in man unless the donor and recipient are identical twins. Even between identical twins very few successful transplants of whole organs have been performed—one was a kidney transplantation reported last year by Murray et al.[22] Dempster[23] pointed out that homotransplants could survive in the lower orders of animal life, but that they became increasingly unsuccessful as the phylogenetic scale was ascended. Discussing the reasons for the disintegration of transplanted tissues and organs, he cited Loeb's[24] belief in the importance of the local cellular reaction, but inclined to the view that it was due to an actively acquired immunity reaction on the part of the host. This hypothesis is strongly supported by the work of Medawar,[25] who showed that in rabbits second-crop homotransplants of skin from the same donor to the same recipient disintegrated more rapidly than the first crop. He afterwards found that the local application of cortisone to skin-grafts in rabbits prolongs the survival.[26]

The consistent failure of homotransplants to survive in man has not deterred investigators in this field, and it is not surprising that the transplantation of endocrine glands should have received particular attention. As they are relatively independent of a nerve-supply for their proper functioning, and discharge their secretions directly into the circulation, their transplantation presents no difficult technical problems. Ever since 1909, belief in the ultimate feasibility of such a procedure has been encouraged by Halsted's so-called law[27] which states, on very limited evidence, that the transplantation of an endocrine gland is more likely to be successful if there exists in the host a deficiency of its particular secretion. This "law" is supported to some extent by the work of Turner,[28] and has been explained by Woodruff and Woodruff[29] on the ground that a high circulating level of the appropriate trophic hormone from the pituitary promotes the survival of transplanted endocrine tissue. Halsted's original observations were, however, based on the transplantation of parathyroids, which are believed not to be the targets of any pituitary hormone.

There is as yet no convincing evidence of permanent survival of transplanted endocrine glands in man although therapeutic activity has undeniably been observed for limited periods—for example, in the case of Addison's disease which Broster and Gardiner-Hill[30] claimed to have cured by adrenal transplantation. Bland et al.[31] claimed the cure of a case of postoperative hypoparathyroidism by the implantation into the rectus muscle of parathyroid tissue from a 29-year-old man who had just died, but their report covered only four months' follow-up.

It has been suggested that fœtal tissue, being less antigenic than fully differentiated tissue, would be less liable to destruction by an immune reaction in the host. Dempster[23] is pessimistic about this line of research, but astonishing results have been claimed by Kadyseva[32] of the Jaroslav Medical Institute who has implanted pituitary glands from 4–5-month-old fœtuses into three pituitary dwarfs, all of whom are said to have responded by substantial acceleration of growth.

Kooreman and Gaillard[33] cultivated fœtal parathyroid tissue in media to which increasing amounts of serum from the prospective recipient had been added in the hope of "acclimatising" the tissue to its future environment. They reported 42 grafts in 29 hypoparathyroid patients, in 21 of whom the result had been observed for at least a year. The grafts were apparently entirely successful in 7 of these patients, all below the age of 36. This lead has now been followed by Escamilla et al.,[34] who have applied the method to 14 transplants in 11 cases of surgical hypoparathyroidism. 6 of these transplants were taken from the parathyroids of infants who were stillborn or who died shortly after birth, and 8 were obtained from parathyroid adenomas removed at operation. The parathyroid tissue was grown in a basic salt solution in the presence of increasing concentrations of recipient serum, and implantation was carried out after about two weeks of tissue-culture. The implants were made into pockets in the sheath of the axillary vein, the number of fragments implanted varying from 13 to 80. The results were on the whole disappointing. In one case symptoms of hypoparathyroidism had not returned after nineteen months, but unfortunately the diagnosis was not confirmed biochemically before the implantation. In a second patient convincing biochemical improvement was obtained for about a year, and partial relief has continued for thirteen months after a second implant. Transient improvement lasting for one to six weeks was seen in 6 cases, and no improvement whatever in the remaining 3.

It cannot be said that this latest excursion into the difficult but ever-tempting province of endocrine transplantation offers much more hope of useful therapeutic results than have earlier experiments in this direction. But the small measure of success which Escamilla and his colleagues have achieved will no doubt encourage other workers in this field.

## DISABILITY

TODAY it is increasingly realised that, when we have failed to prevent crippling, our duty is not merely to keep the cripple alive and comfortable but to enable him, if we can, to take his place in society—to support himself, and to lead as full a life as possible. The International Council for the Welfare of Cripples exists to foster schemes which promote these aims. Supported partly by the United Nations but largely from voluntary contributions, the council does not offer direct services to patients, but seeks to coördinate and help the efforts of local and specialised organisations. It provides translations and films, and engages in instruction and propaganda to the public. Now in London it is holding its seventh world congress, with papers on many aspects of disabilities and their treatment, and a public exhibition at Central Hall, Westminster, which will be open until the end of this week (Friday and Saturday, 10.30 A.M. to 6.30 P.M.).

The British Government exhibit illustrates the many services organised by the State, and other countries have corresponding displays. The Bulova school of watch-making shows how cripples have been so trained that

22. Murray, J. E., Merrill, J. P., Harrison, J. H. Surgical Forum. Chicago, 1956; vol. 6, p. 432.
23. Dempster, W. J. *Brit. med. J.* 1951, ii, 1041.
24. Loeb, L. The Biological Brain of Individuality. Springfield, Ill., 1945.
25. Medawar, P. B. *J. Anat., Lond.* 1944, **78**, 176.
26. Billingham, R. E., Krohn, P. L., Medawar, P. B. *Brit. med. J.* 1951, ii, 1049.
27. Halsted, W. S. *J. exp. Med.* 1909, **11**, 175.
28. Turner, C. D. *Anat. Rec.* 1939, **73**, 145.
29. Woodruff, M. F. A., Woodruff, H. G. *Phil. Trans. B.* 1950, **234**, 559.
30. Broster, L. R., Gardiner-Hill, H. *Brit. med. J.* 1946, ii, 570.
31. Bland, W. H., Cheeson, A. L., Crow, J. B. *N. C. med. J.* 1950, **11**, 501.
32. Kadyseva, N. M. *Probl. Endokr. Gormonoter.* 1956, **2**, 90.
33. Kooreman, P. J., Gaillard, P. J. *Arch. chir. neerland.* 1950, **2**, 326.
34. Escamilla, R. F., Kempe, C. H., Crane, J., Goldman, L., Gordan, G. S. *Ann. intern. Med.* 1957, **46**, 649.

over 90% are now working as watchmakers or jewellers, many owning their own shops. Various firms demonstrate prostheses (both useful and cosmetic), equipment (such as an electrically propelled chair and cuirass respirators), and gadgets to make everyday tasks possible for the disabled. Organisations illustrate the particular kinds of work they do.

In his address to open the congress, Lord Hailsham, Minister of Education, pointed out that everybody has disabilities and that one of the objects of education is to overcome these. The education of the handicapped differs in degree, but not in kind, from that of the apparently normal. The two principles of dealing with them were to recognise their right to education and treatment, and to treat them as normal people, with only such adjustments as are necessary to meet their handicaps. They desire, he said, neither the indifference of society nor a lavish outpouring of attention.

## BLOOD-COUNTING BY MACHINE

THE counting of blood-cells is still a standard technique in most hæmatological laboratories, where it takes up a lot of the technicians' time. The methods introduced by Dacie [1] for preparing the fluids correctly diluted for filling the hæmocytometer chamber have been widely adopted; they save time and help accuracy. But, despite improvements, it is all too easy for the blood-counter to make mistakes, and indeed the range of possible error in the red-cell count has been so large that some workers (including Dacie) have thought that it was not worth doing. Instead they propose that the red-cell count should be replaced by examination of a stained blood-film, together with calculation of the mean cell-hæmoglobin concentration (M.C.H.C.); this is the ratio of the hæmoglobin content to the packed-cell volume, both of which can be estimated with satisfactory accuracy.

Clinicians have never been reconciled to abandoning the red-cell count, which they still regard as diagnostically useful.

If a patient with a hæmoglobin of 70% (10·5 g. per 100 ml.) has a red-cell count of 2,500,000 per c.mm., he may well have early pernicious anæmia; if the count is 7,000,000 per c.mm. he has polycythæmia; if it is 5,000,000 per c.mm., he will have iron-deficiency anæmia. The M.C.H.C. will distinguish only the last of these, and then not invariably; and the stained film may give no clue unless the viewer is exceptionally experienced.

It is for such reasons as this that efforts have been made to devise machines that will carry out blood-cell counts. A blood-cell counter, using a photo-electric cell and electronic counting, was demonstrated at the International Hæmatology Congress held in Cambridge in 1950; but progress with it has been slow. Following demonstrations by a British firm, such headlines as "Robot Will Fight Blood Diseases" [2] have appeared in the press; so it seems timely to see how far we have got.

Several types of blood-cell counter are now being tried. The "flying-spot microscope" of Causeley and Young [3] has not been commercially exploited, perhaps because its results are not consistent enough. Brecher et al.[4] based their counter on the principle that cells are poor electrical conductors compared with saline.

A dilute suspension of cells is prepared in a solution of 0·9% NaCl, with a little added human serum-albumin. The fluid is drawn through a narrow aperture conducting an electric current between platinum electrodes; exactly 0·5 ml. can be passed through. Each cell as it passes modulates the electric current, and the resulting pulses are amplified and passed to an electronic counter. Such a machine has the disadvantage that it makes no distinction between different types of cells and will count white cells as well as red cells.

1. Dacie, J. V. Practical Hæmatology. London, 1956.
2. *Newcastle Journal*, Feb. 22, 1957.
3. Causeley, D., Young, J. Z. *In* Modern Methods of Microscopy. Edited by A. E. J. Vickers. London, 1956.
4. Brecher, G., Schneiderman, M., Williams, G. I. *Amer. J. clin. Path.* 1956, **26**, 1439.

Another type of machine arranges for a photo-electric cell to "scan" the whole area of a hæmocytometer chamber and count all the cells.

For this purpose a chamber is used giving a definite volume as usual, but without rulings. The machine comprises a microscope with suitable illumination, a mechanical device for so moving the hæmocytometer on a stage that the correct area is scanned, and electrical equipment to amplify and count the pulses from the photo-electric "eye." By using the usual diluting fluids, red cells, white cells, and even platelets can be separately counted. At least two commercial machines of this type are now being advertised. But they have disadvantages: the moving-stage mechanism must be very accurate and very robust, the microscope and its illuminating system must also be accurate and stable, and the electrical equipment must be reasonably long-lived. Accordingly the machines are necessarily expensive and servicing may not be easy; a British machine is quoted at about £700, an American one at about £1100. And, as machines go, they are notably slow; one model takes 2½ minutes to carry out a red-cell count, and to this time must be added the time to fill properly the hæmocytometer chamber; a skilled technician could do as well, and could also say something about the cells.

These machines with their moving parts seem likely to give way to a different type, somewhat similar to the model originally shown in 1950, which dispenses altogether with the hæmocytometer chamber and its attendant moving stage. A counter of this type now being commercially demonstrated uses the "fluid-flow" chamber devised by P. Crosland-Taylor.

Water enters the bottom of a vertically mounted capillary tube at low velocity and accelerates progressively until it leaves the chamber through a very small aperture at the end of an upper capillary tube. A special pump delivers a known volume of suitably diluted blood—0·2 ml. for red-cell counts and 1 ml. for white-cell counts—into the lower capillary; and the blood-cells, entering the progressively faster-moving stream of water, are drawn out into a long, eventually monocellular, line. Just before they reach the upper jet the cells are separated to the greatest extent and are viewed at this point by a dark-ground projection microscope which forms an image of each blood-cell on a photomultiplier tube. The water-flow system is a closed circulation, and cells that have passed through the counter (and all particles larger than 2 μ in diameter) are removed by an easily replaceable plastic filter. This counter deals with 5000 red cells or 500 white cells in 10 seconds, and, once the dilutions are prepared, four counts can be made and averaged in under a minute. An accuracy of ±3% is claimed. The containers take 4 ml., so for red cells an ordinary 0·02-ml. pipette can be used for taking blood; the dilutions can be prepared by the technician going her rounds at the same time as the dilutions for hæmoglobin estimation are put up; the cells can be counted when she returns to the laboratory. In one model 0·4 ml. of blood is needed for white-cell counts; this is too large a volume to be obtained accurately from a finger-prick, and, of course, any necessity for an intravenous sample would defeat the value of the machine. This difficulty will no doubt be overcome.

The machine demonstrated was sensibly arranged; the various parts were assembled in "units" that could be easily replaced if faults developed, though the construction seemed adequately robust and, apart from the filter, frequent replacements were not expected.

This machine will cost about £600: a laboratory will have to do a great many counts if such an outlay is to be worth while. It will not save a lot of technicians' time; but it will release them from one of the most boring jobs in the routine hæmatological laboratory, and boredom breeds inaccuracy. It will certainly be useful in departments—for instance, in atomic-energy establishments—that carry out numerous supervisory blood-counts. Since patients have still to be seen and have blood taken, and differential white-cell counts have still to be carried out, it is not likely that blood-counting can be mechanised in the same way as can many clerking jobs. But a reliable blood-counting machine will have its place in the larger laboratories, and it seems that such a machine will soon be available.

# Special Articles

## WOMEN IN PRISON ON "ATTEMPTED SUICIDE" CHARGES

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HER MAJESTY'S PRISON SERVICE, HOLLOWAY

SUICIDE always has medical as well as sociological facets, but in this country the care of people who have attempted suicide presents special problems to doctors, because before the law these patients are criminals who can be punished by imprisonment.

It seems illogical that those who fail in their suicidal attempts are looked on as criminals, whereas those who succeed in killing themselves are usually deemed at the coroner's inquest to have been unbalanced in mind. Though suicide may generally be regarded in most countries as an undesirable act, England, with India and a few States in the U.S.A., is in the minority in regarding attempted suicide as a crime. We have an example as near, both geographically and culturally, as Scotland, where it is not an offence in law. Nor does this immunity seem to lead to difficulty in the disposal of patients, as Batchelor and Napier [1] show in their report on 200 patients admitted after a suicidal attempt to an observation ward in Edinburgh.

In 1954 in England and Wales of 4844 cases of attempted suicide known to the police (2480 males and 2364 females) 662 were charged—i.e., about 1 in 8. Although only a minority go to prison, it may be of interest to study a representative sample of this group, and the present paper is based on a consecutive series of 100 women whom I interviewed in prison between January, 1954, and December, 1956. Those women, whose charges of attempted suicide were coupled with other charges, such as larceny and fraud, have been excluded except in 2 cases where the other charge was not pursued.

### Analysis of Cases

*Age*

Ages varied from 17 to 81, the mean being 32 years. The patients fell into the following age-groups.

| *Years* | *Patients* | *Years* | *Patients* |
|---|---|---|---|
| 17–19 | 14 | 50–59 | 6 |
| 20–29 | 36 | 60–69 | 3 |
| 30–39 | 24 | 80–89 | 1 |
| 40–49 | 16 | | |

Thus three-quarters were under 40 years of age. This is comparable to figures given by Stengel [2] who found the peak age in women (35–44) to be lower than in men (65–74).

*Nationality and Religion*

10 were foreigners, from Europe, of whom 4 were refugees, who had been in this country from nine to sixteen years. In only 1 woman had difficulty in adjusting to a new country been of importance.

57 were Church of England (42 uninterested), 29 were Roman Catholic (11 uninterested), 4 Presbyterian (3 uninterested), 3 Lutheran (2 uninterested), 2 Jewish (unorthodox), 2 Salvationist, 2 agnostic, and 1 Greek Orthodox. Religion seemed to play an unimportant part in the lives of most of them.

*Marital Status and Isolation*

48 were single, of whom 12 were cohabiting or in an involved situation, and a further 15 attributed depression to worry over love affairs or illegitimate pregnancies. 44 were married, of whom 27 were separated or divorced, 10 claimed to be unhappy in their marriages, and 2 had husbands in prison. Only 5 said their marriages were without friction, and of these 2 were epileptic and 2 psychotic, while 1 attributed her depression to debts of which her husband was unaware. 8 in the age-groups from 40 upwards were widowed. An unhappy home background was therefore common. 29 seemed to have been living in loneliness, either separated from husbands or widowed, and the importance of social isolation [2] is evident.

*General Health*

In only 2 patients (1 with chronic pulmonary tuberculosis and 1 with long-standing asthma) was physical disability present and in both it was thought partly responsible for the suicidal attempt. The first patient had defaulted from the chest clinic for six months and the second had continued under the same doctor for years.

8 patients were pregnant, and their pregnancy was a cause of depression. 5 patients had lately been confined, 4 of the babies being 6–12 weeks old: 1 of these mothers was psychotic (a chronic schizophrenic), while 2 were classified as psychopathic and 2 as neurotic depressives.

49 patients gave a history of previous mental illness: 42 of them had been in mental hospitals, 20 more than once. 10 had been certified, 27 had been voluntary patients, and 5 both certified and voluntary. 4 had had psychiatric outpatient treatment (including 1 at an approved school) and 3 had attended their own doctors. 2 had had leucotomy.

Thus, most of the women were physically healthy, but there was a high prevalence of past mental illness, often treated in mental hospitals. But only about 8 patients said that they had lately been under treatment or had consulted their doctors in the near past.

*Previous Convictions*

30 patients had had previous convictions, including 3 for being in need of care and protection, and the rest for larceny, drunkenness, wandering abroad, soliciting, and attempting suicide. 64 had had no previous acquaintance with courts or prisons, and a further 6 had only been acquainted through a charge of attempted suicide.

42 said that they knew suicide was illegal but this had not deterred them. 11 had previously been charged with attempting suicide, and of these 7 had been put on probation (2 on two occasions), 2 sentenced to imprisonment, 1 certified insane, and 1 given an absolute discharge.

It is doubtful whether charging these 11 patients had any deterrent effect. Their reappearance on a similar charge suggests that it had not. This impression is reinforced by the fact that 42 knew that court proceedings might follow their attempt.

*Court and Act*

All the women came from magistrates' courts except 1 from sessions.

The largest number (38) came from eleven London courts, the rest from Kent (13 from nine courts), Middlesex (9 from six courts), Essex (8 from three courts), Sussex (8 from seven courts), Hants (5 from three courts), Berks (5 from three courts), Surrey (4 from four courts), Bucks (3 from three courts), Norfolk (3 from three courts), and 1 each from a court in Suffolk, Cambridge, Oxford, and Huntingdon.

All cases of attempted suicide who are sent to prison are admitted to the prison hospital, and 51 came in under section 26 of the Criminal Justice Act, 1948, which means that they are convicted but are sent in for one to three weeks for a medical report, and then return to court. Although given the advantage of a medical report and recommendation, they suffer the disadvantages of the convicted prisoner. Most of these (30 out of 51) came from London courts.

43 were admitted on remand, with a request for a medical report in 31 cases. It is, of course, possible that outside medical evidence was available to the courts in the 12 cases in which no report was asked of the prison

1 Batchelor, I. R. C., Napier, M. B. *J. Neurol. Psychiat.* 1954, 17, 261.
2. Stengel, E. *Proc. R. Soc. Med.* 1952, 45, 613.

doctor. A minority (7 out of 43) came from London courts, who therefore used section 26 more than outlying courts.

6 patients arrived in prison already sentenced, the sentences varying from three to nine months' imprisonment. 1 of them came from a London court.

*Mode of Admission*

75 women had gone to a general hospital after their attempt and thence to court. 30 of these seem to have been kept in hospital only a few hours for such first-aid treatment as was thought necessary; 23 spent up to three days, 15 from three to seven days, and 7 from one to two weeks in hospital.

9 were in an observation ward for one to two weeks before appearing in court. 6 were in a mental hospital, 5 as voluntary patients who discharged themselves after one to two weeks, while 1 had been sent by the court for three weeks for a medical report.

The remaining 10 were taken directly to a police-station and thence to court.

It is noteworthy that a large proportion (90) of these women were seen in, or admitted to, hospitals before appearing in court, and yet found their way to prison. The 53 who spent three days or less in general hospitals were probably seen by casualty officers or other junior doctors, but the 22 who were retained for up to two weeks may have had the advantage of a more senior or specialist opinion.

*Method of Attempt*

An overdose of drugs was used in 54 cases (barbiturates and "sleeping tablets" in 34 cases, and aspirin or codeine in 18). Other methods were gas (17), cutting (15), drowning (5), poison (3), falling in front of a vehicle (3), strangling (1), fall from a height (1), and swallowing a foreign body (1). Thus the commonest method was an overdose of drugs. The number of suicides attempted by this means is known to have risen, particularly since 1948.

23 women gave warning of their intention by letters, which suggests conscious need for help from the community in a social situation, the difficulties of which seemed to the patient insoluble, though the importance of psychological processes operating within the personality must not be underestimated.

44 patients admitted to previous attempt at suicide. That 56 seem to have been charged on their first attempt is not in keeping with the commonly held belief that nobody is thus charged.

*Diagnosis*

49 women were classed as psychoneurotic, 19 as psychotic (8 schizophrenic, 3 senile psychotic, 8 depressive including 6 menopausal), 16 as psychopathic, 11 as epileptic, and 5 as borderline or mental defective.

This series, since it was collected in prison, might be expected to include more psychopaths than those reported from observation wards, but Batchelor and Napier [1] found 17 psychopaths in their series of 108 women and Stengel [2] 6 in 64 women.

24 were chronic alcoholics, and 16 of these attempted suicide after drinking. In this alcoholic group, 10 were diagnosed as psychoneurotic, 8 as psychopathic, 4 as psychotic, 1 as epileptic, and 1 as borderline defective. Alcoholism was commoner in this group than in Stengel's (6 in 138) or Batchelor and Napier's [3] (13 in 108).

These prison cases were perhaps known to the police through previous charges of drunkenness; but 14 seem to have had no previous charges, 5 had previous charges other than for drunkenness, and only 5 had previous charges, usually numerous, for drunkenness.

While in prison, 18 had no formal intelligence test, but the rest were submitted to a battery of basic tests with Wechsler and projection tests where indicated. 63 were classed as average, 21 as subnormal, 5 as borderline or defective, and 11 as superior. 2 were self-employed (café-owner and dressmaker), 2 were nurses (1 assistant and 1 student), 12 did clerical work, and the rest worked in factories or shops and as domestics.

*Disposal*

12 were recommended for certification, 11 as insane and 1 as mentally defective. These patients would either be transferred from court to an observation ward or a doctor would attend in court to give evidence of insanity and they would be taken immediately to a mental hospital.

38 were referred for treatment as voluntary patients in mental hospitals, and a probation order was included by the court for 21 of them. 27 were placed on probation, of whom 21 were recommended for treatment at a psychiatric outpatient clinic. Half the group was therefore thought to be in need of inpatient treatment in mental hospitals, and a further 21 of outpatient treatment. 7 were sent to a hostel or convent, 5 of them on probation. This brings the total placed on probation to 53.

4 were discharged by the court, 1 was deported, and 1 went home to Ireland.

10 were sentenced to imprisonment, the sentences varying from two to nine months (2 of two, 2 of three, 5 of six, and 1 of nine months). 3 of them appealed, all successfully, against their sentences, 2 being placed on probation (1 with a condition of treatment at a psychiatric outpatient clinic), whilst the 3rd was treated as a voluntary patient. 1 was certified as an alcoholic psychotic during her three-month sentence, and 6 completed their sentences.

## Discussion

Because suicide was condemned by ecclesiastical courts it became an offence in common law, by means of which the Crown used to obtain the suicide's property by forfeiture. The language still used to describe the act, "unlawfully attempting to commit suicide against the peace of our Sovereign Lady the Queen, her Crown and Dignity," recalls the medieval origin and is an anomaly in modern times.

The plea sometimes put forward that the court sends the suicidal person to prison for his own safety is surely out of keeping with modern psychiatric facilities and treatment. It must, however, be acknowledged that courts and police are ready to seek a medical opinion, since in 82 of these 100 cases a medical report was requested from prison, and in some of the remaining 18 cases medical evidence from other sources may have been available. Furthermore, most of the women were seen in hospital before appearing in court. It is difficult to see on what grounds the decision is made as to whether the patient is to be charged or not. Does the fact that the majority were retained in hospital for so short a time suggest that for them the decision was made after assessment mainly of the physical rather than the psychiatric state?

Stengel,[2] in his account of 138 cases of attempted suicide seen in a London observation ward, reports that about 9% were admitted through the police, but none of his cases were disposed of through that channel. He also mentions that according to the register of suicides and attempted suicides kept by the statistical branch of the Metropolitan Police District, the attempted-suicide rate is 6 to 7 times higher than the suicide-rate. On this basis the number of attempted suicides in London for 1946 would have been about 5000, but the actual number registered was only 696. Probably many attempts became known to doctors and are dealt with without reference to the police.

One reason why these patients, stay in hospital is often short is that some of them—usually the alcoholics

3. Batchelor, I. R. C., Napier, M. B. *J. ment. Sci.* 1954, **100**, 419.

and psychopaths—can be a nuisance to those around them, and may be unwelcome in both general and psychiatric wards. In the present series the alcoholics numbered 24, 16 of whom attempted suicide while under the influence of alcohol. But these alcoholics included 4 psychotics, 1 epileptic, and 1 mentally defective, who could be regarded as psychiatric problems in need of treatment rather than as delinquents. The other alcoholics might or might not be treatable. Psychopaths often flounder in the no-man's land between prison and mental hospital, but in this series there were only 16 of whom 5 were alcoholics.

So we are left with only 29, out of the total 100, who could be regarded as falling into the nuisance category Among these we may expect the attempted suicide to be not very determined, and it might be argued that a charge of drunkenness or breach of the peace could meet the case. The abolition of "attempted suicide" as a charge would avoid the admission to prison of mentally ill patients, to whom such an experience may be an additional cause of depression, and to whose relatives it can be a cause of distress. Since most of these women had had no previous court or prison experience they were the more likely to be disturbed by it. From the medical viewpoint this treatment of the mentally ill is to be deprecated.

Among those who were sentenced to imprisonment, all who appealed against their sentence were successful, which suggests some doubt within the legal profession as to whether a prison sentence is suitable for this offence. Its apparent failure as a deterrent is demonstrated by the 11 who had been previously charged with a similar offence, and the 42 who knew that their act was illegal. This manner of handling the problem seems to be both therapeutically damaging and socially unconstructive. The incidence of previous psychiatric illness, for which treatment had been given in 49 patients, underlines the medical nature of the problem, and though it could possibly be argued that this high rate suggests a failure of previous medical treatment, it does not seem probable that legal treatment offers a better solution.

Most of the women were placed on probation, usually with a condition of treatment, either as inpatients or outpatients. The probation officers undoubtedly give most conscientious and effective supervision and help, seeking such aids as psychiatric treatment and Alcoholics Anonymous; but they usually have too many cases under their care, and it is doubtful whether they are really the appropriate people to look after these patients. When a patient is under psychiatric supervision and treatment, would it not save work and effort if their supervision was left entirely to the social workers in the mental health service?

I am indebted to the Prison Commissioners for permission to publish this article, which does not necessarily represent their views. I am grateful to Mrs. E. R. Radford, PH.D., who kindly gave me access to her results of psychological tests on the cases reported.

## DANGERS OF ATOMIC ENERGY

### Statement after Scientists' Meeting

AT the invitation of Lord Russell, a group of scientists from different countries met at Pugwash, Nova Scotia, on July 6–11, to assess the dangers to humanity which have arisen as a result of the development of nuclear weapons. The meeting was particularly concerned with (1) the hazards arising from the use of atomic energy in peace and war, (2) problems of the control of nuclear weapons, and (3) the social responsibility of scientists.

A statement unanimously adopted by those taking part and issued after the meeting referred to their independent assessment of the effects of the nuclear tests carried out hitherto. The hazard, compared with others to which mankind was subject from natural causes, was small. Nevertheless, because of the world-wide distribution of fission products, and the fact that some areas might be subject to effects much above the average, close attention to the dangers should be maintained, especially if tests of bombs which give large radioactive fallout continued to be made. The principal objective of all nations, the statement went on, must be the abolition of war and the threat of war. War must be finally eliminated, not merely regulated by limiting the weapons which may be used. For this purpose, it was necessary to reduce tension among the nations; to promote mutual understanding among the people; to strive for the ending of the arms race; and to provide an adequate control system so as to give substantial protection, and permit the development of mutual confidence.

Regarding the responsibilities of scientists, the statement spoke of "our common conviction that we should do all in our power to prevent war and to assist in establishing a permanent and universal peace. This we can do by contributing to the task of public enlightenment concerning the great dilemma of our times; and by serving to the full extent of our opportunities, in the formation of national policies."

# Conferences

## GEOGRAPHICAL PATHOLOGY OF GASTRIC AND DUODENAL ULCER

FROM A CORRESPONDENT

THE 6th Conference on Geographical Pathology was held in Paris on July 9–11, under the presidency of Dr. J. DELARUE. Twenty-seven countries were represented. The main topic of the meeting was the varying incidence of gastric and duodenal ulcer throughout the world.

J. M. MAY (United States) emphasised the uneven, scanty, and inaccurate material and the varying methods of collection of statistics, which made comparison difficult. Nevertheless, a number of firm observations emerged from the meeting. H. MASUDA (Japan) recorded the highest death-rate in the world from peptic ulcer, with a notable preponderance of gastric ulcer. On the other hand, A. DONGAL (Iceland) found an exceptionally low post-mortem incidence of duodenal ulcer, the gastric/duodenal ratio being 7/1. G. G. HADLEY (South India) confirmed the striking absence of peptic ulcer in the Punjab and noted that Kashmir had an incidence even greater than that found in South India. P. G. KONSTAM (Nigeria) found peptic ulcer prevalent in the southern region, the north being relatively free. As in South India, the ulcer tended to involve the duodenum with considerable fibrosis, but seldom caused hæmorrhage or perforation. He postulated the existence of a distinct variety of peptic ulcer—tropical peptic ulcer—with different ætiology and pathology from the duodenal ulcer of Western civilisation. F. HENSCHEN (Sweden) recorded appreciable differences between different parts of Sweden and the same was reported from Yugoslavia and Italy by M. ANDREJEVIC and G. SOTGIU.

From Great Britain, there was an excellent regional survey of York and the surrounding countryside by C. N. PULVERTAFT, who had succeeded in establishing an absolute incidence by tracing all the diagnosed ulcers. The incidence was appreciably higher in the city of York

itself than in its surroundings. G. WATKINSON (Great Britain) reported an analysis of 7000 necropsy records from a number of centres in Great Britain in 1956 and demonstrated a clear excess of duodenal ulcer in the north, as compared with the south of England, the gastric-ulcer figures being evenly distributed.

The rising incidence of duodenal ulcer, particularly since 1920, was demonstrated from several countries. This was particularly well shown by the impressive analysis of post-mortem statistics over forty years by J. L. HANSEN (Denmark). He distinguished between "essential" ulcers causing death and "accidental" ulcers found incidentally. The "accidental" ulcers could be related to the total population to provide a figure for morbidity. The analysis demonstrated the increase in duodenal ulcer in the male population, with gastric ulcers remaining constant in men and declining in women. F. AVERY JONES (Great Britain) emphasised the importance of separate consideration of gastric and duodenal ulcer statistics, since they may well be separate diseases with different ætiological factors.

In considering ætiological factors behind the geographical and temporal variations, there was much diversity of opinion, but few facts. Various speakers found it hard to attribute variations entirely to psychosomatic considerations, but it could not be denied that these play a rôle in less well-developed communities, as well as in Western civilisation. J. N. P. DAVIES (Uganda) commented on the sharp increase in duodenal ulcers among Kikuyus separated from their families who were living under the threat of Mau-Mau attacks. Dietary considerations seemed a more likely cause of the broad geographical differences between North and South India and North and South Nigeria.

The aggravating rôle of chronic respiratory disease was emphasised by several speakers, including M. DEMOLE (Switzerland); and R. DOLL (Great Britain) demonstrated that cigarette smoking appreciably slowed the rate of healing of gastric ulcers.

F. BUCHNER (W. Germany) and R. O. K. SCHADE (Great Britain) reviewed the pathology of peptic ulcer. It was thought that two types of chronic gastric ulcer existed—the classical peptic ulcer with a deep ulcer crater and the flat ulcer which was probably more often found in those cases in which histologically there was a chronic atrophic gastritis and clinically an achlorhydria. A. LAMBLING (France) surveyed the physiological background of gastric secretion, with special reference to the differences between gastric and duodenal ulcer subjects.

Among the communications on other subjects, R. LETAC (France) reported the extreme rarity of venous thrombosis in North Africa; J. HIGGINSON (South Africa) noted the low incidence of gastric and intestinal cancer among the Bantu, but the Eurafrican incidence was the same as in white races; and G. BRAS (Jamaica) recorded his experience of veno-occlusive disease causing cirrhosis of the liver in childhood and due to the taking of herbal teas containing senecio.

The conference illustrated the need for studying geographical incidences as a research tool. The rules of the International Society of Geographical Pathology were widened to permit individual membership, and it was hoped that many more would be attracted to this developing field of medical thought. The secretary of the society is Prof. F. C. Roulet, Institute of Pathology, Basle, Switzerland.

## Medicine and the Law

### The Treatment of Offenders

THE great majority of prison sentences are for comparatively short terms. In 1954 almost 70% were for six months or less, and over half were for three months or less. This is perhaps partly because nineteen out of every twenty criminal cases are dealt with by the magistrates' courts whose powers of fine and imprisonment are less than those of the superior courts. Another factor is probably the increasing desire of judges and magistrates to use the power of imprisonment sparingly.

In many cases, however, a short term of imprisonment is undesirable. It is not so much that the prisons are cluttered with short-term prisoners; even though the proportion of short sentences is so high, only a tenth of the daily population of the prisons in 1954 were serving terms of six months or less. The real disadvantage of the short sentence is that in many cases it does no good and may do harm.

The Advisory Council on the Treatment of Offenders[1] recognise two categories of person for whom it would be desirable to provide an alternative to a short sentence. First, there are those whose offence suggests that prison is prima face unsuitable and useless; among these are the chronic alcoholics, women convicted of child neglect, and husbands who default on maintenance orders. The council evidently gave a good deal of thought to these special types of offender, but it is only with regard to defaulting husbands that they make any really constructive suggestion. This is that use should be made of the Scottish system of the attachment of wages and salaries. With regard to child neglect, the council say that few neglectful mothers are sent to prison, and that consideration of possible alternatives to imprisonment should be deferred pending the report of the committee recently set up under the chairmanship of Viscount Ingleby to inquire, among other things, into the law relating to the prevention of cruelty to juveniles and powers of local authorities to prevent the suffering of children through neglect in their own homes.

With regard to the chronic alcoholic, the council considered but rejected a proposal that the Inebriates Acts should be revived. The council say that almost all the alcoholics in prison are of poor intelligence and unlikely to be cured by detention in a reformatory; some Continental countries have schemes for curative detention but they deal with a better type of alcoholic. The council see no alternative at present to imprisonment, although occasionally probation might be tried especially if residential treatment can be arranged. The council also make mention of the work of Alcoholics Anonymous and their centres, but make no positive proposals in this connection.

The second category of offender for whom the council would like to see an alternative to imprisonment is the prisoner convicted of an offence such as larceny or assault, whom prison neither deters nor trains but may contaminate. In this connection, the council suggest the establishment of an experimental attendance centre for youths of 17–21; but they are not at present in favour of attendance centres for adults.

1. Alternatives to Short Terms of Imprisonment. H.M. Stationery Office. 1957. Pp. 32. 2s.

### Blood Tests in Legitimacy Case

Evidence of blood tests was accepted as conclusive by a Scottish court in a case concerning the legitimacy of a child.[1]

The case was highly unusual in that the mother claimed a declaration that the child was illegitimate and not the lawful child of her former husband. The couple had been

1. *Times*, July 15, 1957; *Scotsman*, July 15.

married in January, 1949, three weeks after the birth of the child. In December, 1951, the husband had obtained a divorce on the ground of misconduct, and had been granted custody of the child. The husband had then claimed that the child had been legitimated by the subsequent marriage, and the wife had not disputed the husband's claim to be the father.

The woman now asserted that the father was a Pole, now believed to be in Poland. By having the child declared illegitimate, she hoped to be able to obtain custody of the child and to rear her in her own home, which she occupied with her present husband who was the paramour in the divorce action of December, 1951.

Giving judgment, Lord Wheatley referred to blood tests carried out by two doctors. Unless there was a rare case of mutation—the odds against which were at least 100,000 to 1—he was prepared to accept their evidence that the child was not the daughter of the divorced husband. The court accordingly granted the declaration sought by the mother.

The effect of the declaration was to override the decree as to custody made in December, 1951, because custody could not be granted to someone who was not the child's father. In the circumstances, the child's welfare could not be considered. Lord Wheatley commented:

"Experience in the divorce court makes it increasingly difficult to understand the motives which impel people to follow certain courses, and sometimes the interests of children are disregarded, or put in pawn, or used as levers in order that the personal gratification of the parent can be, for the moment, satisfied. In retrospect, remorse or revenge may cause a change of front, if not of heart, and the child is thrown into the cockpit of dispute."

### Benzidine and Bladder Cancer

At a Manchester inquest on July 11, it was stated that contact with benzidine used in a process of dyestuffs manufacture had led to the death of a 56-year-old workman. The verdict was accidental death from bladder cancer.

The widow said her husband had worked as a chemicals weighman at the same dystuffs manufacturing premises both before and after the late war. Since 1953 he had been off work with illness and in 1954 was advised by the works doctor to see a specialist. He was admitted to hospital six months ago and died on July 3 after an operation.

A foreman at the works said that in 1948 Walker began to be troubled by boils and the following year he ceased to work as a weighman. Men were provided with protective clothing and pads for the mouth and nose. There were excellent facilities for bathing, and frequent tests were made to check the health of employees. A workman who had worked with the deceased before the war said that no protective clothing had been issued to workmen in that department up to 1938 but a proportion of men were given tests at intervals.

A medical technologist said the company employed him to make tests for the early diagnosis of cancer of the bladder. Since the danger of handling benzidine was first realised in 1941 workmen who might be exposed to the danger were protected. When the deceased was employed between 1935 and 1939 he would have been in contact with benzidine, at a time when the risk was not appreciated. From 1941 many precautions had been taken to minimise the danger and the method of manufacture had been altered and new plant installed. The deceased had not handled benzidine after his return to work in 1946 and tests had proved negative. Three years ago, however, they disclosed a condition which was diagnosed as probably due to exposure to benzidine between 1935 and 1939.

## In England Now

*A Running Commentary by Peripatetic Correspondents*

AN addition to the postgraduate medical scene is always an event, and the decision of the Conjoined Board to initiate a Diploma of Stethoscopy will be warmly welcomed. Following hard upon the heels of such established diplomata as the DIP. TONSOLOGY (divided into right and left branches according to which tonsil the aspiring specialist intends to study), the D.S. makes a notable extension to the field of postgraduate endeavour. The objects of this new enterprise will be obvious to most: the raising of stethoscopic standards, sadly slipshod by the criteria of our grandfathers; the promotion of research into a neglected subject; and the provision of labour and letters for frustrated medical registrars. The entrance fees (15 guineas for each part) should, in the first year, enable the board to purchase fitted carpets, and gild the cornices in the examiners' dining-hall, work badly needed.

The examination for the new diploma will be in two parts. Part I will deal with the principles of acoustics and stethoscope-construction and will include a paper on the anatomy and physiology of the parts of the body normally auscultated. The proposal that this part might be taken by undergraduates has been rejected. Part II may not be taken until the candidate has been qualified for at least seven years, and is divided into a number of branches. The D.S.(MED.) concerns itself with the chest, and the D.S.(SURG.) with the bowel-sounds. The D.S.(OBST.) requires a thorough knowledge of the stethoscopy of the fœtal heart, but both latter branches may include a question on the lung-bases. The examination is by written paper, clinical, and viva-voce, and the candidate is expected to pass all three. Candidates over the age of 35 may submit published work in lieu of examination provided that this advances the practice of stethoscopy. A limited number of honorary diplomas may be awarded.

It is expected that other bodies will soon also offer this additional qualification. London University is thought to be already considering an academic diploma, and the possibility has been mentioned of setting up an honours degree course for those proposing to use the newly designed electronic instrument. If, as seems likely, the provincial universities follow suit, short-listing will be easier for consultant appointments, since candidates without the diploma of the neighbouring university will hardly expect to be considered.

* * *

Longer ago than I care to think, I was registrar to a famous cardiologist. I can remember him coming to hospital and saying "It's a great nuisance, but I am afraid that we shall have to take lead four as a routine."

Some five years ago I sat at dinner next to another great cardiologist. "Funny how people still use the standard leads" he said; "They're of purely historical interest, of course."

Yesterday my registrar came to me with a puzzling cardiogram for my inspection. "The thing is" she said, "they've taken what they call standard limb leads one, two, and three, and I've never understood those." It would seem that the revolution is now complete.

* * *

When the layman feels tense, unhappy, lonely, rejected, depressed, or browned-off, all he needs to do is to say to himself: "I've got a pain under my ribs. It's probably the old ticker again. I'll just pop round to see my doctor." At the surgery the doctor tells him his heart is quite all right. All that's the matter is that he has been working too hard, taking life too seriously, and being generally overconscientious about everything. The doctor pats him on the back and the patient goes away twice the man.

But what can a doctor do when he feels fed up? He can try saying all those things to himself, but they sound hollow and unconvincing that way. Or he can consult a colleague; but colleagues are too fond of ordering uncomfortable barium meals and painful biopsies.

I overcome the difficulty from time to time by finding something wrong with my mouth—usually cancer. I go to my dentist, have my teeth polished, and then just before I get up from the chair I ask casually. "By the way, I suppose this is nothing here?" He looks and then says: "That's just a muscle attachment—you've got one on the other side just the same. Are they keeping you busy these days, doctor?" And so we are off.

But I can't be forever having my teeth polished, so very often I drive out to a little village store—the comprehensive kind catering not only for the household but also for the sick body. The proprietress beams at me across the counter between a pyramid of soap-flakes packets and a cardboard structure advertising disinfectant.

"What is it today, Sir?" she asks.

"Indigestion," I say. "Awful nagging pains just under my ribs here. Oh I do feel poorly."

"Yes, you're looking very tired too, Sir. I expect you've been working too hard. What you need is a tin of these Wallopo Fruit Salts. They'll put you right in no time."

And they do.

* * *

The problem of the 1000 chamber-pots is exercising the minds of all the more thoughtful of your readers, including the members of the committee which meets as often as necessary in the George and Dragon to consider matters of such importance as this. Their unanimous recommendation is that the pots should be offered to Oxford, that city of 1000 spires, where a proper use would no doubt be found for them.

* * *

Peace has returned again to Adam Street, now that the Tivoli has been pulled down at last after months of banging and rattling, dull thuds, screeching and grinding, clattering and explosions, hissing steam, and (above all) that nerve-shattering pneumatic drill—comparative peace that is to say; for still every hour or so the eerie silence is broken by a solitary metallic clang, which formerly was lost in the all-pervading cacophony. The last spasms of the dying Tivoli? No, merely the postman shutting the pillar-box after collecting the letters.

* * *

This is the Glasgow Fair—equivalent to the August Bank Holiday. There's an air of anti-work around—but we're nearly all in the lab trying to do it. Funny! The Welfare State has curious results. There's no postman and no outpatients—but loads of consultants.

* * *

Mrs. Bailey, it is absolutely *vital* to realise that if you want Jimmie to eat you must not make an issue out of things that don't matter. Do you know what I mean?

Nay. I can't say as I do.

Well suppose he wants his pudding before his meat and vegetables—what do you do?

I tell 'im if 'e doesn't down 'is dinner I'll clout 'im on th' lug.

No you don't. That's just what you *don't* do. You give him his pudding first. What does it matter? It all gets thoroughly mixed up anyhow. And if some days he's off his appetite and pushes his food away don't argue the toss with him. Just take it and eat it yourself or give it to the dog.

We 'avn't got a dog.

Well get one. They are invaluable for licking up left-overs. The point is *don't make an issue out of things that don't matter.*

Aren't you going to give 'im something?

He doesn't need anything. *You* need advice, that's all.

Am I to bring 'im back if 'e gets worse? 'E's going to a shadder.

According to my tables he is 4½ lb. overweight. Well good-day Mrs. Bailey; good-bye, Jimmie.

Say bye-bye to the doctor. Say bye-bye, Jimmie. . . . Well blow a kiss to the doctor. Go on! Blow it! I'll lam thee Jimmie Bailey! Say bye-bye you stubborn little mule! All right. That settles it. No iced lolly!

Jimmie began the dreadful howl of the newly dispossessed. I watched them through the window making their embattled way down the drive. Well, when all is said, it is still the survival of the fittest.

# Letters to the Editor

## CONSULTANT AND SPECIALIST

SIR,—The letter of S.H.M.O. (July 20) and, in the same issue, the report (p. 135) of Mr. Holmes Sellors's remarks at the B.M.A. meeting, make sad reading.

Is all this frustration really inevitable? Or is there a flaw in the, comparatively recent, grading of specialised work in this country?

I think there is. The gap in pay, security, and prestige between the successful applicant for a consultant post and his fifty or more equally well-qualified fellows who fail, is much too wide. If there was a fair correlation between the numbers of suitable applicants and available posts, success might indicate superior merit. Since there is not—in most specialties—the present method of entry into specialist rank is unrealistic.

I submit that a more equitable solution might be found in:

(1) Restricting the title "consultant" to those senior specialists who deserve it by acting as superior authority for their specialist colleagues. They would only in exceptional cases be less than 50 years old. Their number would not be large. They would probably be identical with those now receiving merit awards. Add the awards to their salaries—and the controversial award system could disappear.

(2) Granting the appropriate specialist designation (physician, surgeon, anæsthetist) to all "time-expired" senior registrars, S.H.M.O.s, and "consultants" (except the new senior authorities). Let their salaries rise, say, from £1500 at 32 to the top of the present whole-time "consultant" scale at 50. If it is thought necessary, give the junior label to those under 35 or 38.

Unbiased investigation of these proposals will show that their adoption would (1) diminish, if not abolish, present frustration; (2) induce the Treasury to provide more posts at little extra cost; (3) impress the Royal Colleges with the need to limit the numbers admitted to examinations for higher degrees, where necessary. Many young doctors would prefer to be disappointed before rather than after having spent years and money on degrees which lead nowhere.

Dinton, near Aylesbury. L. S. MICHAELIS.

SIR,—Your leading article of June 1 draws attention to the advantages of an intermediate grade of assistant physician and assistant surgeon.

Before the N.H.S. was instituted many hospitals were staffed, wholly or partly, by physicians and surgeons who were also general practitioners. These men were not elected to the hospital staff until they had shown themselves worthy of the honour—and they were honorary physicians and honorary surgeons. These posts were much sought after, as they were the stepping-stone from G.P. to consultant.

At the commencement of the N.H.S., most of these men were graded as consultants in the first instance, but at the regrading two years later, they were downgraded to G.P. status. They now come into the category of 10(b) of the Terms of Service, and are paid at the rate of £175 per session (plus 5%) by hospital management committees, and not directly by regional hospital boards. They are debarred from the domiciliary-visiting service, and as a consequence patients are responsible for consulting fees.

In 1955 there were over 3000 doctors employed in the hospital service under 10(b) of the Terms of Service. Some as physicians having full clinical responsibility for beds and outpatients, some as surgeons also with full clinical responsibility, some as anæsthetists, and some as clinical assistants. Of this 3000, it is estimated that about 500 are in fact doing consultant or specialist work with

little or no consultant cover, as in fact they were already doing before the N.H.S. was thought of. This type of appointment before 1948, was one of the "plums" of general practice.

No machinery exists in the N.H.S. whereby these men can have their status reviewed, but at the annual representative meeting of the B.M.A. in 1956, a motion was passed for consideration by the council "that grading reviews be instituted to consider claims for up-grading by doctors holding 10(b) appointments in the hospital service." The council of the B.M.A., in paragraph 99 of its annual report for 1956–57, has approved the recommendation.

Many of these men have large consulting practices, and it is a gross injustice that they should be graded as junior medical staff. Those of them who do not fulfil the criteria required for full consultant status, could very properly be put into the intermediate grade you advocate of assistant physician or assistant surgeon.

Redhill, Surrey. L. J. BARFORD.

## REBUILDING THE HOSPITALS

SIR,—Most of the hospitals in this country require to be rebuilt, but the prospects of getting the necessary money out of the taxpayer are remote. It seems to be very desirable therefore that hospital management committees should realise that the only way to get a modern hospital is to collect the necessary money by voluntary subscription. There are advantages to be gained if a community provides the standard of hospital it wishes, and the Ministry can then say: "you build what you want, and we shall run it for you."

Even if this view may be regarded as rather extreme by some, it is certainly desirable that every patient should at least be offered the opportunity to contribute to the hospital's free monies.

Oxford. W. RITCHIE RUSSELL.

## COST OF THE HOSPITAL SERVICE

SIR,—The cost of the National Health Service continually rises. I suggest that much labour and money could be saved in many hospital departments. When new diagnostic techniques are introduced, large numbers of cases are naturally sent for investigation. In time the limitations of the new methods are defined, but the numbers of patients do not decrease.

For example, every day, all over the country, many hundreds of radiographs are taken: probably less than half give any useful result, as far as diagnosis and treatment are concerned. Radiographs are usually taken before and after "setting" of a fracture; in fact, most of the "before" films could be omitted, since a correct diagnosis is usually possible without them. Moreover, in ear, nose, and throat departments vast numbers of radiographs of nasal sinuses are ordered, most of which give little useful information. In the early days this was justified, but now experts know when radiographs can help. I feel over-use of many other departments could similarly be avoided without curtailing proper treatment. To prevent and investigate this wastage is the duty of the medical staffs.

The chief of an X-ray department could examine every radiograph taken in his department during one month. With the help of colleagues from other departments, he could decide how many films had been unnecessary. Steps could then be taken to avoid wastage, and similar procedures could be adopted in other departments.

Unless such steps are taken it is hard to see the financial future of the hospital service.

London, W.1. HAROLD KISCH.

## SMOKING, DRINKING, AND NERVOUSNESS

SIR,—Having been interested and baffled for some time by the ætiology of certain cases which we call "psychosomatic" for want of a better name, I was recently able to collect some figures, with the generous assistance of a few colleagues, on a related subject—the bearing of nervous temperament on addictions such as alcohol and tobacco. In this small inquiry we collected information about 291 male patients aged 30–59 who were either "not nervous" or who possessed a degree of nervous disposition which was defined either as "moderately nervous" ("tense," or "peace of mind easily upset"), or "seriously nervous" ("occasionally unable to work" or "at times in hospital"). The smoking and drinking habits of the patients were appropriately classified, and, with the work of Kretschmer, Sheldon, and Parnell in mind, the subjects selected were also classified broadly according to body-build. The inquiry did not presume to be more than a very elementary and introductory study, but the results are not without interest.

In the accompanying table, the "non-nervous" group has been compared with both nervous groups and with the moderately nervous only. The patients included in the two samples being compared have been matched in respect of place of residence and broad age-group (30–34, 35–49, 50–59). Where more patients were available in the one group than in the other, those selected from the former for matching with the latter were chosen by a standard method of random selection.

COMPARISON OF SMOKING AND DRINKING HABITS IN "NERVOUS" AND "NON-NERVOUS" MEN

| Habits | Comparison between non-nervous and all nervous | | Comparison between non-nervous and moderately nervous | |
|---|---|---|---|---|
| | No. of non-nervous | No. of all nervous | No. of non-nervous | No. of moderately nervous |
| (*a*) Smokers (all forms of tobacco) | 90 | 87 | 71 | 71 |
| (*b*) Non-smokers | 30 | 33 | 21 | 21 |
| (*a*) Cigarette smokers | 84 | 82 | 65 | 67 |
| (*b*) Non cigarette smokers | 36 | 38 | 27 | 25 |
| (*a*) Smoked more than 18 cigarettes a day | 32 | 46 | 26 | 41 |
| (*b*) Smoked less than 18 cigarettes a day | 46 | 32 | 35 | 20 |
| (*a*) Pipe smokers | 16 | 9 | 15 | 7 |
| (*b*) Non pipe smokers | 104 | 111 | 77 | 85 |
| (*a*) Imbibers | 102 | 97 | 81 | 80 |
| (*b*) Abstainers | 18 | 23 | 11 | 12 |
| (*a*) Heavy drinkers | 11 | 24 | 9 | 19 |
| (*b*) Light or moderate drinkers | 82 | 69 | 68 | 58 |
| (*a*) Lean body-build | 27 | 29 | 19 | 21 |
| (*b*) Heavy body-build | 35 | 33 | 21 | 19 |

One other analysis, which I have not included above, was a comparison between body-build and cigarette-smoking habits, but the differences between the cigarette-smoking habits of the lean and heavy types were not significant.

Applying the appropriate statistical tests of significance, the table seems to suggest the following conclusions:

(*a*) Neither the moderately nervous nor the seriously nervous patients are more likely than the non-nervous to be smokers.

(*b*) Among those who are *already* cigarette smokers, the moderately nervous are likely to be heavier smokers on the average than the non-nervous. The questionnaires were completed during March to May—i.e., before the recent burst of publicity about smoking and lung cancer—so that it may be

fair to conclude that the nervousness led to the heavier smoking rather than vice versa.

(*c*) Neither the moderately nervous nor the seriously nervous patients are more likely than the non-nervous to be drinkers.

(*d*) Among those who are *already* drinkers, the nervous are likely to be heavier drinkers on the average than the non-nervous.

It is also possible that with larger numbers, a significant deficiency of pipe smokers among the moderately nervous patients might well have emerged.

It might be thought that the conclusions suggested are rather superficial and perhaps only what would have been expected, but I do not think the possibility has been observed before that while a degree of nervousness may lead cigarette smokers to smoke more than average and drinkers to drink more than average, the nervousness may not result in more individuals smoking or drinking.

It is, of course, tempting to wonder whether an expanded inquiry along these lines would be of value in connection with the problem of smoking and lung cancer, especially as Blumberg et al.[1] have shown that certain psychological factors can affect the rate of growth of neoplasms and that rapidly growing cancers are particularly to be found in people with certain types of nervous tension. I also understand that the statistical evidence on smoking and lung cancer is not inconsistent with the possibility that some form of nervous tension may accelerate the rate of growth of an established neoplasm and lead the patient to be a heavier smoker of cigarettes than otherwise. Naturally, I do not suggest that our small inquiry proves anything of this; among other things, our definition of nervous tension was very much simpler than the one used by Blumberg et al. Moreover, I would not suggest that psychosomatic factors could provide the whole explanation of the statistical association between smoking and lung cancer; the lung-cancer cases in the various statistical inquiries generally included a higher proportion of smokers than the matched control cases whereas we found no difference between the proportion of smokers in the nervous and non-nervous groups. Nevertheless, it is perhaps not impossible that heavy smoking may to an unknown extent be a symptom rather than a cause of lung cancer.

London, W.1. W. MOODIE.

## CIGARETTES AND LUNG CANCER

SIR,—I have followed your leading articles and the correspondence about the tobacco-cancer controversy with much interest. The statement on tobacco-smoking and cancer of the lung recently issued by the Medical Research Council (June 29, p. 1345) is admirable for its dispassionate tone and its objective summary of the evidence. Perhaps now, after begging the question for so long, the individual physician will tackle the problem of prevention represented here.

One of the questions in the paper in preventive medicine set this spring for the third-year medical students at Dalhousie University was: "Discuss the present state of our knowledge of the ætiology of carcinoma of the lung with emphasis on the preventive aspects." One student wrote (I quote directly): "We must overcome the cigarette tobacco companies whose advertising aims are to initiate 5000 new smokers a day . . . at present due to advertising companies who make a lucrative profit out of initiating lung cancer, the voice of prevention through 'no cigarette smoking' is a fairly quiet one."

I have no comment except to invite Mr. Alfred H. Dunhill (May 18, p. 1042) to put this in his much-admired pipe and smoke it.

Halifax, Nova Scotia. JOHN O. GODDEN.

1. Blumberg, E. M., West, P. M., Ellis, F. W. *Psychosomat. Med.* 1954, **16**, 277.

## ATTACK ON ANOXIA

SIR,—Reading your review of the long-term treatment of severe anoxic bronchitis-emphysema (July 20), I was surprised at your faith in such measures as breathing exercises, bronchial relaxants, and oxygen. I was disappointed that you made no reference to long-term antibiotic therapy, which is the only effective barrier against recurrent episodes of anoxia and heart-failure.

The value of antibiotic therapy for acute exacerbations is generally accepted, but many physicians continue to use penicillin as the initial drug of choice. I am convinced that chloramphenicol, the tetracyclines, and the combination of streptomycin with penicillin are more effective than penicillin in the high proportion of patients infected by hæmophilus organisms. Owing to frequent relapse caused by fresh infections, it is now my practice to treat bronchitics who have had a dangerous anoxic illness or pulmonary heart-failure with one of the tetracyclines continuously. Experience of this treatment in over 50 patients, some of whom have received chlortetracycline for over two years, has persuaded me that it is effective and that the high cost is justified. Some of these patients have been able to dispense with mersalyl and some have returned to work after months or years of invalidism. Late toxic side-effects have not been encountered, although in some cases treatment had to be stopped in the early stages. The dose should never exceed 250 mg. t.i.d., and 250 mg. b.d. will usually suffice; vitamin-B complex should also be given.

Sheffield. JAMES FLINT.

## THE STATE OF DEVELOPMENT OF NEWBORN AFRICAN CHILDREN

SIR,—Dr. Cicely Williams, in her very pertinent comments (July 13) on the article by Dr. Geber and Dr. Dean (June 15), asks to what extent can a difference in maternal handling during the first 24 hours after birth account for the African baby's advancement in motor behaviour at 1 day old and subsequently over that of the European baby. She writes: "Child development is now regarded as a subject of major importance. It is essential to distinguish between intrinsic differences and those that depend on environment. . . . I hope that some aspects of causation may be considered in future articles."

One fact, not yet very generally known, does, I think, throw some light on this question. Hess and Weinstock,[1] in a most unjustly neglected paper published as long ago as 1925, showed that the calcification of the carpal bones was more advanced in American Negro than in white newborn infants. Later Christie[2] and his colleagues confirmed this observation in infants X-rayed within 72 hours of birth at Johns Hopkins Hospital, and showed that the advancement applied to all the bones of the arms and legs. Christie summed up his observations by writing: "Negro infants are physiologically more mature than White infants."

Jones and Dean[3] have shown that this advancement in skeletal maturity occurs as well in the East African in Uganda as it does in these American Negroes of mostly West African origin. Upper-class well-nourished Baganda are advanced over white American children at all ages from birth to at least three (whereas English children are somewhat retarded compared with the same American standards).

It is extremely unlikely that differential degrees of activity during the first 72 hours after birth could account for the greater deposition of calcium in the limb bones of the coloured infants: indeed, there is no present evidence that exercise affects the speed of maturation of the skeleton, even if the exercise takes place over a much longer period. In addition there is some fairly good

1. *Amer. J. Dis. Child.* 1925, **29**, 347.
2. *Ibid*, 1949, **77**, 355; *J. Pediat.* 1939, **14**, 156; *Amer. J. Dis. Child.* 1941, **61**, 471.
3. *J. trop. Pediat.* 1956, **2**, 51; and personal communication.

evidence that these white-Negro differences are present in the fœtus two weeks before birth, as are the well-known male-female differences in maturity.[4]

Thus, Dr. Cicely Williams's question can be tentatively answered for at least one characteristic of African children: their advancement in respect of skeletal maturity either depends on "intrinsic differences" or else on differences in prenatal environment, and the former is certainly the more probable. It is, I think, likely that much of the advancement in behavioural tests described by Dr. Geber and Dr. Dean is intrinsic too, and depends on the degree of maturity of bones, muscles, and brain.

Institute of Child Health,
London, W.C.1. J. M. TANNER.

## EUSTACHIAN SELF-INSTILLATION

SIR,—As Dr. Niosi pointed out last week, yawning opens the eustachian tubes. Air-travellers have been advised to open their tubes by swallowing, chewing, or shouting; but yawning is, in my experience, much more effective. It is surprisingly easy to yawn at will as the aeroplane descends, thus avoiding earache and perhaps even barotrauma.

Windsor. DAVID JACKSON.

## DOWN AMONG THE ARCHIVES

SIR,—I am not certain whether, in your annotation of July 6, you mean that the Ministry of Health has already given permission for hospital case-notes to be destroyed after six years, or is considering doing so. If the former, then it would be important to know what prior consultation had taken place with the profession on a matter of such great clinical interest.

Even apart from research considerations, previous hospital case-records are frequently, not just occasionally, most helpful in dealing with problems which arise in diagnosis and treatment. Examples in plenty will come to the mind of anyone who has worked in hospital practice for several years.

Can it really be supposed that after six years a careful record of a patient's health and disease ceases to be relevant to the further handling of his health problems? Do not the body and mind at any age reflect in some degree all that has happened to the individual throughout the whole of life? Are we then to destroy this document concerning the evolution of his health?

It should be remembered that the prime function of a hospital is care for the welfare of patients, and not administrative convenience. If this ideal is still accepted then it must follow that the destruction of case-records during a patient's life-time is to be deplored: indeed, it is arguable whether case-notes should ever be destroyed. They would, with keeping, become of as much historical interest to our descendants of 2110 as are the pre-1800 ones now spared destruction, and for that same reason.

Adequately indexed storage of the records of a large hospital costs a lot of money, but then so does any other major department or item of service for that hospital. If the notes were destroyed, the great expense of modern hospitals would be money wasted to the extent that the patient's welfare was so lightly disregarded and effort not made to benefit from the hard lessons of the past.

Aberdeen. C. D. NEEDHAM.

*** The National Health Service Act made the Minister of Health responsible for hospital records. By the eighth schedule (Public Records: Ministry of Health: National Health Service) he classified clinical notes (except those in mental or mental-deficiency hospitals) as documents not of sufficient public value to justify their preservation in the Public Record Office. They may be destroyed six years after the end of treatment or three years after death if the patient dies in hospital.—ED. L.

4. *Amer. J. Obstet. Gynec.* 1950, **60**, 133.

## ST. LUKE'S TIDE SERVICES

SIR,—I have read with interest the letter by the Bishop of Lichfield (July 6). I should like to make one very important observation and to draw attention to another matter.

The observation refers to the panel of doctors quoted in the letter as being able to fulfil preaching functions at St. Luke's Tide. As far as the Anglican Church is concerned, it is usually an understood fact, of which the Bishop of Lichfield himself seems unaware, that only men *licensed* by bishops—e.g., lay readers, of whom many are medical men—are allowed the hospitality of church pulpits. Most bishops are very strict on this matter. It is possible that the panel might contain men quite spiritually inadequate for the ministrations desired of them. A note of warning is therefore needed.

The other matter to which I wish to draw attention concerns a body known as the Union of St. Luke, which was founded in 1948 to deepen the spiritual lives of *communicant* Anglican doctors, and to foster a strong link between the Church and Medicine. Growth in membership is much to be desired and all Anglican doctors are warmly invited to become members. I will gladly forward particulars of membership to anyone interested.

Royal Earlswood Institution,
Redhill, Surrey. J. B. GURNEY SMITH
Hon. Treasurer, Union of St. Luke.

## HYPOTENSION DURING HALOTHANE ANÆSTHESIA

SIR,—After reading Dr. Foster's letter[1] on cardiac arrest with halothane ('Fluothane'), we feel that it may be of value to record 2 similar cases, neither of which ended fatally but in which the same profound drop in blood-pressure was seen.

After using halothane with very satisfactory results, vaporised from the trichlorethylene bottle of a Boyle's apparatus, and basing our technique on the scale described by Johnstone,[2] we decided on grounds of cost to try using a closed-circuit technique once the patient had been stabilised on halothane. Using the bottle as before, we induced anæsthesia using a concentration of up to 3–3·5%. The gas flow was then turned down to 300–500 c.cm. per min., and the halothane turned either off or just on.

The results of this technique proved satisfactory except in the following cases.

CASE 1.—A fit muscular man, aged 57, was undergoing repair of a recurrent right inguinal hernia. As premedication he was given pethidine 100 mg., chlorpromazine 50 mg., and atropine 0·65 mg. Anæsthesia was induced with thiopentone 250 mg. and continued with halothane. After two to three minutes, the halothane was turned off, the gas-flow reduced to oxygen 400 c.cm. a minute, and the circuit closed. After about five minutes the pulse could not be felt and the blood-pressure was unrecordable. The patient's colour remained good and spontaneous respiration was maintained at a very satisfactory volume. The foot of the table was raised, and after a few minutes the blood-pressure was recorded as 60/50 mm. Hg. The operation was satisfactorily completed. Carbon dioxide with oxygen was then given. The feet were still further raised, and methylamphetamine, in two doses of 6 mg. intravenously, brought the systolic pressure up to 100. Thirty minutes later the patient asked for a drink of water and said he felt "fine."

CASE 2.—A man, aged 78, with acute upper abdominal pain, was admitted for laparotomy. Premedication was pethidine 75 mg., chlorpromazine 25 mg., and atropine 0·65 mg. After induction with thiopentone 250 mg. followed by gallamine 80 mg., the patient resisted intubation. After a further 20 mg. of gallamine a cuffed tube was passed. Halothane was given in an initial concentration of 3–3·5%, using controlled respiration. In five minutes the systolic pressure fell from 140 mm. Hg to 50. Raising the foot of the table caused a transient rise to 75. After methylamphetamine 12 mg. intravenously and 6 mg. intramuscularly, the systolic pressure was maintained at around 90. The operation was completed in twenty-five minutes. Thirty minutes later the patient regained consciousness and made a satisfactory recovery. During the latter part of the operation, numerous

1. Foster, C. A. *Lancet*, 1957, **i**, 1144.
2. Johnstone, M. *Ibid*, p. 1196.

extrasystoles were felt. Postoperative electrocardiogram was normal.

It is obvious that, until some method is devised of estimating the concentration of halothane in a closed circuit, this technique must be used with the greatest caution. I would agree with Dr. Johnstone [2] that most of the unpleasant reactions to halothane have been associated with errors in technique.

Dumfries and Galloway Royal Infirmary, Dumfries. R. M. S. KEIR
R. B. S. ROSS.

## DOSAGE OF TOLBUTAMIDE

SIR,—I note in your report of the Banting memorial meeting (July 20, p. 125) that you quote me as saying that the optimal daily dose of tolbutamide in man was about 3 g. In fact, what I did say was that in a series of acute dose-response tests 3 g. of tolbutamide was more effective than 1 g. in producing hypoglycæmia, but when that dose was pushed to 6 g. the hypoglycæmic response became diminished. This finding implied that in man as well as in the laboratory animal, as shown by Mr. G. A. Stewart during the same meeting, tolbutamide appeared to possess a biphasic action depending upon its dose.

The results of this acute dose-response test bear little relation to what one might consider the optimal daily dose therapeutically and in our experience it is of no use in the majority of patients to increase this beyond $1^1/_2$–2 g. per day.

Certain arteriovenous studies reported at the meeting compared the lack of response to insulin and glucose in insulin-dependent diabetics with the response under the same conditions in diabetics controlled with tolbutamide. The results suggested insulin antagonism in the first group.

Postgraduate Medical School of London and the Wellcome Foundation. FREDERICK WOLFF.

## THE BACILLUS OF PFEIFFER

SIR,—During the past few weeks I have noticed a marked increase of *Hæmophilus influenzæ* in throat-swab cultures. The patients concerned are allergic subjects in whom a routine bacteriological overhaul of the upper respiratory tract is carried out, and with one exception none of them gave a history of any recent acute pyrexial respiratory illness.

Direct and "pathogen-selective" cultures are made from throat, post-nasal, and nasal swabs. The pathogen-selective technique (Solis-Cohen) utilises the in-vitro bactericidal power of the patient's fresh whole blood to kill off any organisms to which he is immune and to allow the growth of potentially pathogenic organisms, thus assisting in the differentiation of the ætiologically important organisms from a mixed direct culture, in allergic cases with chronic or focal infection.

Though careful examination of direct blood-agar plate cultures from the throat and post-nasal space of such patients will often reveal a few colonies of *H. influenzæ* in a mixed growth, in my experience it is uncommon to find that organism prominant or predominating. When it does so occur—usually during the winter months—it comes up more in the post-nasal than in the throat culture, and rarely grows out in the pathogen-selective culture.

In the recent cases I refer to, *H. influenzæ* was prominant in the direct throat culture (as well as in the post-nasal) and came through in heavy growth as the predominating or the only organism in the pathogen-selective culture.

Through the courtesy of your columns, I would be grateful for leave to inquire whether other clinical bacteriologists have had a similar experience, or whether this is just a chance happening.

It is of interest, if only one of coincidence, that in *The Lancet* exactly 39 years ago to the month the late Dr. John Matthews [1] reported finding *H. influenzæ* in cultures—just prior to the major outbreaks of the 1918 influenza epidemic.

Though long universally agreed that it plays no symbiotic ætiological rôle with human influenza virus—as does *H. influenzæ suis* with swine influenza virus—why does the Bacillus of Pfeiffer still persist in cropping up so regularly in association with human influenza?

London, W.1. DAVID HARLEY.

## RENAL FAILURE FOLLOWING AORTOGRAPHY

SIR,—The excellent accounts by Mr. Roy, Dr. Dormandy, and others in your issue of July 6 are but two examples of complications possibly arising from errors of technique for the cases in question.

The well-established translumbar method of aortography has many disadvantages and dangers, not the least of which is the maldirection of too high a concentration and often too large a volume of contrast medium into the aorta at or near the origin of the renal arteries. Often only 15–20 ml. of a 30–35% strength of contrast medium will give very adequate results and 15–20 ml. of a 60% strength of contrast medium invariably gives excellent films of good diagnostic quality.

If it is known, from a previous intravenous pyelogram, that one kidney functions poorly or not at all, still further caution is demanded during aortography and only a small volume, not more than 15 ml.—of one of the less toxic media such as 'Urografin' 60%—should be used to protect the normal kidney from damage.

The Seldinger method of aortography is now widely practised but caution is needed here also because the tip of the catheter may, under the influence of the injection pressure, point towards the mouth of a main renal or accessory renal artery and a large volume of the medium may be injected into the artery. At Addenbrooke's Hospital, we have demonstrated this catheter-tip movement on occasions by means of cineradiology; moreover, maldirection of the catheter tip is more likely to occur and should be guarded against in a tortuous aorta. It has, therefore, been our practice to place the catheter tip at an estimated point some $1^1/_2$–2 in. below the hila of the kidneys for non-selective renal arteriography and to allow free mixing of contrast medium with the aortic blood-stream, allowing the injection pressure to fill the segment of aorta adjacent to the renal arteries. The same caution with regard to the amount and concentration of contrast medium (15–20 ml., 60% urografin) should be observed as with the translumbar route. We consider the injection of a 75% medium quite unnecessary and we have long since abandoned it for arteriography.

Cognisant of the possible dangers of kidney damage following injection of an uncontrolled amount of contrast medium into the renal arteries, we at Addenbrooke's Hospital have for the past 15 months adopted the method of selective catheterisation of the renal arteries, as advocated by Edholm and Seldinger [2] and Odman,[3] and have injected small amounts (4–5 ml.) of contrast medium of only an approximately 30% solution of urografin and have obtained renal arteriograms of excellent quality and detail. We have experienced no untoward effects using this technique and no renal complications have ensued. This method also avoids the other risks mentioned in your annotation of July 6. A detailed report of this work is to be published in the August issue of the *British Journal of Radiology*.

Addenbrooke's Hospital, Cambridge. DUNCAN GREGG.

1. *Lancet*, 1918, ii, 91.
2. Edholm, P., Seldinger, S. I. *Acta radiol. Stockh.* 1956, **45**, 15.
3. Odman, P. *Ibid*, p. 1.

## RADIATION AND LEUKÆMIA

SIR,—Court-Brown and Doll [1] have now published in extenso the data derived from a survey of ankylosing spondylitics treated by wide-field X irradiation. They were unable to decide for certain but thought it likely that there was no threshold dose for the induction of leukæmia and that the relation between dose and incidence of leukæmia was a simple linear one. Their report, "the most substantial contribution to date" and probably for some time to come, is likely to be used by everyone interested in these problems, as for instance Lewis,[2] and is certainly a model for others to emulate if they can.

The only other set of human data, from the survivors of the atomic explosions at Hiroshima and Nagasaki, provides an uncertain basis for relating dose and incidence of leukæmia because the dose received was so uncertain. Thus the simple classification of dose by distance, used by Lewis,[2] and others was discarded in favour of a much more detailed classification in the extensive genetic survey by Neel and Schull.[3] Unfortunately a similar analysis of dose in relation to leukæmia incidence does not seem to have been made. Thus, the report of Court-Brown and Doll is at present the only source of human data on radiation-induced leukæmia where a tolerably accurate idea of the dose is available. There may therefore be some point in a further analysis of their data which suggests that susceptibility to leukæmia-induction by irradiation increases with age, the opposite of what would be expected from the findings of Stewart et al.[4] It is also noteworthy that in ankylosing spondylitics treated by irradiation aplastic anæmia occurred almost exclusively in the older half of the population at risk (table 6).[1]

Table 12 of the report [1] shows a fivefold spread with age in the standardised leukæmia-rate. This was taken into

| Age (years) | Leukæmia-rate | | Annual eukæmia-rate | |
|---|---|---|---|---|
| | per 1000 patients per 1000r over whole period at risk | per million per röntgen per year | Expected per million persons exposed to a single dose of 55r | Age-specific rate actually observed 1946–53 |
| 14 – | 1·3 | 0·2 | 13 | 17 |
| 25 – | 2·9 | 0·5 | 29 | 22 |
| 35 – | 2·9 | 0·5 | 29 | 34 |
| 45 – | 6·7 | 1·2 | 67 | 57 |
| 55 + | 9·7 | 1·8 | 97 | 109 |

The age-specific death-rates are given for age-groups 5 years older than the rates for spondylitics where the grouping was according to the age of initial treatment.

account by a standardisation procedure when estimating dose-response relationships, but no consideration seems to have been given to the possibility that the difference in incidence with age might represent a real difference in susceptibility to leukæmogenesis by radiation. If such a difference exists, different conclusions might have been reached about simple proportionality between incidence of leukæmia and radiation dose.

Court-Brown and Doll's table 15 gives the mean spinal dose (for males only) for the same age-groups as the leukæmia-rates of table 12 (males and females together). By combining the two sets of data it is possible to derive the leukæmia-rate per 1000 patients per 1000r, as in the table above (column 2). On the hypothesis that there is a linear relation between dose and leukæmia-rate, these rates will be the same as the leukæmia-rate per million per röntgen.

From table 16 the mean man-years at risk per male patient was 5·5 years. Dividing by 5·5 therefore gives the annual incidence per million per röntgen (see accompanying table, column 3). Multiplying these figures by 55 gives, on the linear hypothesis, the annual incidence per million expected to follow a dose of 55r (see table, column 4).

The age-specific death-rates for leukæmia in England and Wales are given by Lea and Abbatt [5] (data cited from Case and Pearson), and are also shown in the accompanying table. There is a surprising similarity between these national death-rates and the expected annual rate per 55 röntgen (columns 4 and 5), which suggests that the susceptibility to irradiation in absolute terms increases with age, whereas the doubling dose (over a 6·5 year observation period) is about 55r partial body irradiation at all ages.

This comparison may suggest a variety of speculations but proves nothing. Nevertheless, over the apparently linear portion of the curve relating dose and leukæmia-rate (Court-Brown and Doll's fig. 1), the variation with age in leukæmia-rate—standardised for dose as far as the reported data allow (column 2)—is as great as the variation with dose in leukæmia-rate (standardised for age)—i.e., age is quantitatively almost as important as dose. Thus the straightforward method of assessing dose and years at risk used in the report [1] may not be valid. Some weighting factor is needed to take into account the increase in susceptibility to radiation with ageing, and until this is provided the dose-response relations given in the report should perhaps be regarded as not to be relied upon. It is not possible to check this suggestion by more detailed analysis of the data provided by Court-Brown and Doll: their dosage data are given only in the form suitable to the analysis which they chose to make.

Medical Research Council
Radiobiological Research Unit,
Harwell, Berks.

R. H. MOLE.

## SNAKE-BITE AND ITS TREATMENT

SIR,—The warm spell at the end of June brought a spate of adder bites in the south of England. Accounts of some of these accidents find their way into the popular press, with the result that the dangers from the bite of our only poisonous reptile become much exaggerated. It is doubtful whether adults ever succumb to viper (or adder) bites (*Vipera berus*) in this country, and the venom is dangerous only to small children.

The question arises whether the heroic measures often employed are justifiable. It may well be that more damage is done by the treatment than by the vicious adder itself.

The popular remedial measures are the tourniquet, incision, and laceration of the wound, together with suction. The latter two have now been discountenanced in countries, such as India and Brazil, where snake-bite is a serious business. In most cases it is only necessary to put the victim to bed, to give a sedative, and feed him with glucose drinks till he recovers. Whether anti-venin is always essential is a contentious matter; but certainly, on account of the danger of anaphylaxis, it should never be given, in this country, by the intravenous route. I should like to draw attention to the neutralising action of carbolic or 'Lifebuoy' soaps [6] which are now used in India for Russell's viper bites with apparent success. This is a simple and harmless remedy, sanctified by long usage, and a 5% solution can be injected into the site of the bite and surrounding subcutaneous tissue. It delays absorption of the venom.

London, W.1. PHILIP MANSON-BAHR.

SIR,—Has an adder-bite ever killed anybody? At a recent inquest [7] we were told that for a doctor not to have given serum to anyone bitten by an adder would

1. Court-Brown, W. M., Doll, R. Leukæmia and Aplastic Anæmia in Patients Irradiated for Ankylosing Spondylitis. *Spec. Rep. Ser. med. Res. Coun., Lond.* 1957, no. 295. See *Lancet*, 1957, i, 1130.
2. Lewis, E. B. *Science*, 1957, **125**, 965.
3. Neel, J. V., Schull, W. J. Effect of Exposure to the Atomic Bombs on Pregnancy Termination in Hiroshima and Nagasaki. National Academy of Sciences, Washington, publication no. 461, 1956.
4. Stewart, A., Webb, J., Giles, D., Hewitt, D. *Lancet*, 1956, ii, 447.
5. Lea, A. J., Abbatt, J. D. *Ibid*, 1957, i, 389.
6. Ahuja, M. L., Brooks, A. G. *Ind. J. med. Res.* 1945, **36**, 173.
7. See *Lancet*, 1957, i, 1095.

have been criminal neglect. Yet that great naturalist W. H. Hudson observed (in his *Hints to Adder-Seekers*) that people greatly exaggerated the dangers of adder-bites. Was he right?

Caterham, Surrey. J. GIBSON.

## VITAMIN A AND THE CEREBROSPINAL FLUID

SIR,—Your review [1] of vitamin A and the spinal fluid, with regard to teratogenesis, was most stimulating. The reference on which the clinical warning was based, however, was in error because the article cited [2] discussed the development of hydrocephalus following a deficiency of vitamin A in the infant's diet rather than a deficiency in the maternal diet. The maternal dietary intake was noted as excellent, and the infant developed signs of hydrocephalus while being maintained on a hypoallergenic feeding relatively devoid of vitamin A. Consequently postnatal factors alone were held responsible for the hydrocephalus.

At the same time it should be noted that animal experimentation using excessive doses of vitamin A, as well as deficiencies of this compound, has resulted in teratogenesis.[3] Consequently the possibility should be considered that either excessive or deficient intake of vitamin A might result in the development of fœtal anomalies.

Ross Laboratories, Columbus, Ohio. W. O. ROBERTSON
Director, Research Conference Program.

## METALLIC CORROSION IN ORTHOPÆDIC SURGERY

SIR,—Dr. Bowden and his colleagues (May 25) suggested some reasons for corrosion in stainless steel used for internal fixation of fractures. Cater and Hicks [4] have recommended that other corrosion-free metals, including 'Vitallium,' be used instead. They made, however, a reservation with regard to vitallium, in saying that slight corrosion reactions had been seen. The following case shows that this is of practical importance.

A married dock-hand, aged 46, was injured at work on Aug. 4, 1950. He was admitted to Ullevål Hospital the same day with a simple cross-fracture of his left femur, at the junction of the middle and distal thirds of the bone. He also had a fracture of the left tibia and fibula, which are not considered here.

A radiograph showed shortening of 2 in., with the distal fragment dislocated dorsomedially. Tibial traction corrected the shortening, but not the dorsal dislocation. Because of this, the fracture was fixed internally on Aug. 10 with a 6-screw Lane plate of vitallium and bone-chips round the fracture line. Control radiographs on Sept. 5 and 20 showed unchanged conditions with satisfactory position of the fragments.

A radiograph on Nov. 1 showed a fine zone of decreased density around the 2 distal screws. There was little callus formation, but this was not noticed till later, and on Nov. 13 the cast was removed and the patient got up on crutches. Two days later an axial bend of his thigh was observed, and a radiograph on Nov. 20 showed that the above-mentioned screws had lost their grip in both cortical layers of the bone.

The Lane plate was removed on Nov. 20, and the patient was treated with adhesive tape traction until Dec. 28. He was discharged on Jan. 13, 1951, with the fracture consolidated, but with an axial bend of 160°.

The plate and the screws were analysed chemically by Scott's method.[5] The iron content was found to be $1{\cdot}0 \pm 0{\cdot}1\%$ in the screw-point, $1{\cdot}0 \pm 0{\cdot}1\%$ in the screw-head, and $1{\cdot}3 \pm 0{\cdot}1\%$ in the plate.

The potential differences against a calomel electrode were measured in a Phillip pH meter G.M.4491. A synthetic protein-free fluid of extracellular type was used as electrolyte (Na 145 m.eq., K 5 m.eq., Mg 2 m.eq., P 2·5 m.eq., Ca 5 m.eq., $HCO_3$ 25 m.eq., Cl 129 m.eq. per litre). Measurement in a pH meter was necessary to avoid polarisation.

The results were:

Vitallium/extracellular fluid/KCl/HgCl/Hg:
Screw-point/electrode +90 to +110 mV.
Screw-head/electrode +130 to +155 mV.
Difference head/point −20–66 mV.
Plate/electrode +145 mV.

It is possible that under these conditions the alloys will act as a series of solid solutions with different iron content and resulting potential differences.

When Venable et al.[6] introduced vitallium in surgery it was only to avoid the polarisation reactions of the metals used up till then. According to their description, vitallium should be an iron-free alloy of 65% cobalt, 30% chromium, and 5% molybdenum. It was also shown to be completely neutral electrically in the human organism.[7]

Both the clinical picture and the chemical analysis in the case presented here agree with the fact that polarisation-reactions, which depend on electric activity, are also possible in vitallium. This is probably caused by the iron shown to be present.

Oslo. FINN ASKEVOLD
ROLF ASKEVOLD.

## TRAINING IN ADMINISTRATION

SIR,—I thought that it would be of interest to your readers to know the results of the advertisement for a trainee appointment as administrative medical officer to this board, which was referred to in my letter in your issue of April 20.

There was a very good response to the advertisement, the board receiving 25 applications from a wide field of applicants, including those now engaged in clinical hospital work, in public health, in general practice, and in other walks of life. The successful applicant is in fact now an orthopædic registrar in a teaching hospital. He will be taking up his duties on Sept. 1, 1957.

Newcastle Regional Hospital Board. R. H. M. STEWART
Senior Administrative Medical Officer.

## LESIONS OF THE HYPOTHALAMIC REGION AND SERUM-PROTEIN LEVELS

SIR,—I was very interested in Dr. Lomax's correlation [8] between levels of serum-proteins and lesions of the hypothalamic region.

In this connection, Dr. Lomax may be interested to hear that when I visited Professor Lauder's 2nd Department of Medicine at the University of Vienna in the summer of 1950, work was in progress there which showed a definite lowering or disappearance of the specific dynamic action of proteins in subjects with hypothalamic lesions and in fact estimations of metabolic-rates before and after a protein load were used to localise cerebral lesions.

I have no recent knowledge of this study, nor do I know references relating to this work. But it is very likely that the altered plasma-protein values which Dr. Lomax found in certain cerebral lesions are the expression of altered protein metabolism, which is also shown by the lowered or absent specific dynamic action of proteins, indicating, if impaired absorption has been ruled out, decreased tissue utilisation, the hypothalamus presumably exercising control over protein metabolism in a similar way to that in which it controls carbohydrate and fat metabolism, probably via the pituitary gland and a humoral factor. For example, we know that certain steroid hormones, notably androgens, have a marked influence on protein metabolism.

1. *Lancet*, 1957, i, 826.
2. Cornfeld, D., Cooke, R. E. *Pediatrics*, 1952, **10**, 33.
3. Cohlan, S. Q. *Amer. J. Dis. Child.* 1953, **86**, 438; *Pediatrics*, 1954, **13**, 556. Gebauer. *Pharmazie*, 1954, **9**, 684.
4. Cater, W. H., Hicks, J. H. *Lancet*, 1956, ii, 871.
5. Scott, W. W. Standard Methods of Chemical Analysis. New York, 1939.
6. Venable, C. S., Stuck, W. G., Beach, A. *Ann. Surg.* 1937, **105**, 917.
7. Venable, C. S., Stuck, W. G. *J. Amer. med. Ass.* 1938, **111**, 1349.
8. *Lancet*, 1957, i, 904.

Dr. Lomax is apparently content to have ruled out the possibility of disruption of the hypothalamic-pituitary mechanism, because none of the seven patients studied provided any clinical or biochemical evidence of pituitary insufficiency. He does, however, fail to mention which biochemical tests were employed or what particular aspect of pituitary function they were meant to reflect.

As to clinical evidence of pituitary dysfunction being absent, only a fairly severe and prolonged disturbance can be expected to give rise to changes that could be detected by one's eyes, ears, touch, or smell.

Thus the question of how the hypothalamus influences or controls protein metabolism is widely open and may be a fruitful field for clinical and experimental investigation.

Harvard Medical School, Boston, Massachusetts. PETER B. LAMBERT Research fellow.

## SEDATION WITHOUT SIDE-EFFECTS

SIR,—That minor psychoneuroses and tension states are incapacitating is well known. That there is no satisfactory means of alleviating the tiresome and wearing psychic and somatic manifestations of these disorders is, perhaps, not so well appreciated.

One can exhibit a little heat and massage as a placebo, a little phenobarbitone or snake root as a sedative, or dismiss the patient with a few well-chosen words of reassurance. Psychotherapy or psycho-analysis has nothing simple to offer, and so these unfortunates sooner or later have to get by as best they may.

Being of an inquiring mind, I did search around for some simple and innocuous substance to prescribe for these conditions and, after much trial, hit upon what is, I feel, an excellent compound. To those who are not too sceptical to try someone else's ideas, I offer glycine (amino-acetic acid).

Given in small doses (gr. 5–10 t.d.s.), this substance will brighten the patient's day and make life much easier for him and his doctor.

Chelmsford and Essex Hospital. DUNCAN SHIERS.

## REVERSAL OF PULMONARY HYPERTROPHIC OSTEOARTHROPATHY BY VAGOTOMY

SIR,—My experience is similar to Mr. Flavell's.[1] In 1945, we were operating on a patient with bronchial carcinoma who had joint changes of the Bamberg-Marie type. After dissecting free the bronchus and cutting the branches of the vagus nerve, we realised that the tumour was not resectable. We were surprised when the joint pain disappeared after operation. Four months later, pain recurred, simultaneously with the appearance of a metastasis in the opposite lung. This is interesting from the point of view of the ætiology of the syndrome.

My colleagues and I then successfully denervated the lungs of two other patients, and our account was published in 1949.[2] We held that, though denervation of the hilum was more complete, vagotomy was enough, and that sympathetic denervation was unnecessary. In October, 1949, at the Sixth Interamerican Congress of Surgery held in Chicago, Illinois, I pointed out that the disappearance of symptoms, perhaps not as complete or permanent as after pneumonectomy, was obtained by hilar denervation.

Our report of this treatment of pulmonary hypertrophic osteoarthropathy (Bamberg-Marie syndrome) seems to be the first.

Buenos Aires, Argentina. MARIO M. BREA.

1. Flavell, G. *Lancet*, 1956, i, 260.
2. Brea, M. M., Martinez, J. L. y, Alvarez, Geronimo, H. *Bol. Soc. Tisiol. argent.* 1949, p. 47.

## TREATMENT OF MIGRAINE

SIR,—Dr. Spence's letter of June 29 draws attention to the difficulty of treating effectively those migraine sufferers who vomit early in their attacks. As he stated, oral medication in these cases is virtually useless, the tablets being vomited almost as soon as they are swallowed.

I feel that most patients of this type, fortunately the minority of migraine sufferers, would also be unlikely to retain the tablets of the chlorophenothiazinyl-propyl-methyl-piperazine derivative ('Stemetil') which Dr. Spence found successful in controlling the early severe vomiting in his patient.

It is in this type of patient that a suppository form of ergotamine tartrate and caffeine ('Cafergot') may be particularly useful.

One suppository inserted during the migraine prodromata will usually suppress the attack; in more resistant cases a further suppository may be required if no relief is obtained within one hour. In addition to ergotamine tartrate and caffeine, these suppositories contain belladonna and a barbiturate for their anti-emetic and sedative properties respectively. The criticism may be levelled that the circumstances of the patient could make the insertion of a suppository difficult, but in the type of patient we are concerned with, where vomiting is imminent following the prodromal symptoms, this difficulty would, I feel sure, be surmounted. In any case, the injection of ergotamine tartrate, on which some patients rely for their relief, could also be criticised on similar grounds.

Edgeware, Middlesex. R. A. ELLIS.

## THE NEWBORN INFANT'S OXYGEN-SUPPLY

SIR,—May we first make a correction. Dr. Dawes (in a personal communication) has pointed out that neither he nor his co-workers have shown that asphyxia raises the already high pulmonary peripheral vascular resistance in the unexpanded lungs of lambs. This error was due to misinterpretation on our part.

We must point out to Dr. Brown (July 13) that we did not say that the erection of the pulmonary capillaries initiated the expansion of the neonate's lungs. What was said was "Initially the alveoli are expanded by the erectile pulmonary capillaries and the air pressure difference created by respiratory effort." We have no idea how great a part is played by each nor which happens first. Further, one of us (R. E. B. C.) has carefully not recommended any techniques. Until our present research into the correlation between blood-volume and systemic venous pressure is completed, we have asked our very coöperative obstetric colleagues not to change anything.

Dr. Brown's idea that pulmonary hypertension leads to pulmonary distension and hence to the dangers of œdema cannot be substantiated. If Dr. Carter (July 6) will allow us the analogy of Ohm's law, though as he pointed out Poiseuilles is more accurate, it will be seen that the factor creating pulmonary hypertension if the cardiac output remains the same or diminishes will be the peripheral vascular resistance. The evidence in favour of an initially high cardiac output which rapidly diminishes with the first few breaths was re-stated in our letter of July 6, and we must reiterate that our premature babies with the pulmonary syndrome who had high caval venous pressures, surprised us by doing well.[1] The peripheral pulmonary vascular resistance once the circuit is opened up is controlled by the pulmonary arterioles. Their contraction will raise the pulmonary-artery pressure and impede the onward flow of blood to the pulmonary capillaries, so rendering pulmonary capillary over-distension and pulmonary œdema *less* probable.

Our observation of Taussig's sign is the reverse of Dr. Brown's. In infants with large intracardiac shunts

1. Bonham Carter, R. E., Bound, J. P., Smellie, J. M. *Lancet*, 1956, ii, 1320.

the lungs are large and the diaphragms flat. This we do not see in the pulmonary syndrome of the newborn. If such infants with large shunts develop pulmonary hypertension the heart diminishes in size, or does not continue to grow, the apical diastolic murmur disappears, and the lungs are radiologically not so overfilled with blood nor so overblown with air. There is at this time a marked clinical improvement which continues until the shunt is largely reversed. It looks as though Wood's idea [2] of the protective aspect of pulmonary hypertension is correct in this situation as in mitral stenosis.

We were enchanted to find allies in the veterinary field and would like to thank Mr. Mahaffey and Mr. Rossdale for their contribution (July 13).

Lastly, we are most grateful to Dr. Rappaport (July 20) for drawing our attention to his work; our neglect of it was a sad omission. Of course the "architectural function of the pulmonary capillaries" is part of the "visceral function of the lungs." We are delighted to have added something to his original concept.

Obstetric Hospital, University College Hospital, London, W.C.1.

R. E. BONHAM CARTER
M. GUNTHER
J. M. SMELLIE.

## PENICILLIN AND STAPHYLOCOCCAL CARRIERS

SIR,—Dr. Leonard Colebrook has asked [3] whether in some staphylococcal carriers treatment with penicillin becomes ineffective.

Among 571 patients with scarlet fever, we found 72 whose throats yielded both β-hæmolytic streptococci (sensitive, in vitro, to penicillin) and penicillinase-producing staphylococci. After six days' treatment with penicillin (80,000 to 100,000 units every six hours) streptococci remained in the throats of 3 patients, and we attribute the failure of penicillin to the large quantities of staphylococcal penicillinase (intracellular and extracellular) that we were able to detect in vitro and in vivo in these 3 cases. We wonder, indeed, whether the same explanation may not be applicable to other cases resistant to penicillin—e.g., those infected with *Treponema pallidum*.

If penicillin treatment is ineffective, it is always advisable to ascertain whether the patient is a carrier of staphylococci and whether, if so, these staphylococci are penicillinase producers. Penicillin levels in blood and urine should be estimated to find out whether inactivation of penicillin has taken place in vivo as in our cases.

The research was carried out by Dr. M. Bals, Dr. A. Roman, Dr. E. Hotnog, and Dr. A. Simu.

Bucharest. M. BALS.

## HIGH-PRESSURE OXYGEN AND RADIOTHERAPY

SIR,—Correspondence in the lay press has focused attention on the work of Churchill-Davidson et al.[4] This confirmed the earlier work of Gray et al.,[5] on plant and animal tissues, that oxygenation of tumour cells in some way assists the action of radiation in destroying those cells. It also ties up with the well-known work emanating from Warburg's laboratory that oxygen inhibits proliferation in tumour-cell cultures, which can only proceed in an anoxic medium.

The technique used by Churchill-Davidson and his colleagues involves anæsthesia and bilateral myringotomy. Although such a procedure may be safe in their expert hands, what more natural oxygen carrier is there than red blood-cells? A fairly prolonged, steady, intra-arterial transfusion just above the area of malignant tissue (for instance, the radial artery if the carcinoma is on the hand) would ensure a thorough permeation of the tumour cells by a medium with a high oxygen concentration at the site where it is most needed—namely, the malignant tissue (in contrast to an intravenous transfusion which dilutes down the red cells by the total amount of the blood-volume).

This could be tried in combination with radiation or by itself. If oxygen alone is proved to have an inhibitory effect on tumour proliferation, as Warburg's work seems to indicate, it might explain the extraordinary fact that has seldom been emphasised—namely, that body organs which contain blood, or have blood circulating in them, are seldom or never the seat of primary neoplastic growth. Such organs are the heart, the spleen, and the healthy or non-cirrhotic liver, whereas fibrosed liver is subject to hepatic carcinoma.

I suggest the technique of slow intra-arterial blood-transfusion could be tried without risk on a surface tumour, such as an intra-epidermal or a squamous carcinoma of the skin. In the hands of a surgeon the procedure would be safe and because of the slow growth of such tumours postponement of more orthodox treatment for 10 to 14 days offers no risk.

London, N.W.3. I. TARGOWSKY.

2. Wood, P. Diseases of The Heart and Circulation, London, 1956; p. 541.
3. *Lancet*, 1956, ii, 255.
4. Churchill-Davidson, I., Sanger, C., Thomlinson, R. H. *Lancet*, 1955, i, 1091.
5. Gray, L. H. *Brit. J. Radiol.* 1953, 26, 609; Gray, L. H., et al. *Ibid* p. 638.

# Parliament

### Painful Experiments on Animals

IN opening the debate in the House of Lords on July 18 on this subject Lord DOWDING admitted that to ask for the abolition of vivisection was a windmill beyond the reach of his lance, but he did ask that the present law should be amended and properly enforced. The present law, in his view, was riddled with loopholes. Seven different certificates could be granted which allowed experiments to be performed without anæsthetics. True, the so-called "pain clauses" stipulated that if during these experiments the animal appeared to be suffering pain which was severe and/or likely to endure, and if the main result of the experiment had been achieved, then the animal should at once be painlessly killed. But this was futile, because, apart from the vivisector himself, there was no judge as to the intensity of the pain or its probable duration. It was also laid down that if it appeared to an inspector that an animal was suffering severe pain, he might order it to be killed forthwith, but there was no recorded case of any inspector ever having given such a direction. Nor had any prosecution ever been carried out against any vivisector since the passing of the Act in 1876. Offenders were occasionally admonished and warned, but that was generally owing to some irregularity in the certificates which they held and no penalty was attached to such warning or admonition. About $2^1/_2$ million experiments were performed every year in about 520 laboratories. To guard against breaches of the law in these $2^1/_2$ million experiments there were no more than five inspectors. He held that the whole inspection system was a hollow sham, maintained to throw dust in the eyes of critics and to salve the conscience of the apathetic.

Another aspect of the law which disturbed Lord Dowding was the absence of any adequate definition of what constituted an anæsthetic. Reports in the medical journals showed that for some operations and painful experiments only sedative and hypnotic drugs—such as 'Dial,' 'Amytal,' 'Nembutal,' and urethane—were used. Again little information was available about the vast modern trade in animal life and suffering involved in the wholesale manufacture and testing by big animal firms of so-called "therapeutic substances." Thousands of animal lives were expended every week in the manufacture of these drugs, and thousands more in their testing. Yet there had never been any inquiry into the details of this trade. There had been no public inquiry into vivisection and its

kindred questions for nearly fifty years and he asked for a quick and open inquiry into present conditions in the experimental and manufacturing laboratories.

Lord COHEN OF BIRKENHEAD, in his maiden speech, said that he believed that only the woefully ignorant or the wilfully blind could fail to recognise that animal experiments had helped to alleviate suffering, eradicate disease, and save human life. Sera and vaccine had reduced the incidence and danger of typhoid fever, diphtheria, cerebrospinal meningitis; the chemotherapeutic and antibiotic drugs had reduced the mortality of many diseases, including puerperal fever and tuberculosis; insulin had enabled us to control diabetes. Our knowledge of nutritional deficiencies and many major advances in surgery were all based on animal experiments. He did not regard animal experiment as the exclusive method of medical investigation but it was indispensable. He also reminded Noble Lords that when man himself was necessary for a crucial experiment the very people who were alleged to exercise a wanton and cruel outlook to animals in the laboratory had shown themselves ready to sacrifice their lives for mankind.

Though 2½ million experiments had been carried out in 1955 over 2 million of these were simple pinpricks. Again was it not possible that there were no prosecutions because those licensed under the Act were observing the law? Indeed in 1955 only 9 irregularities were recorded, and the inspectors made it clear that in none of these had there been any deliberate intention to contravene the Act. Our present law was more stringent than the law of any other country. He believed that it provided, through certification, adequate safeguards against the infliction of unnecessary pain. Those who, like him, had practised medicine for thirty years and who had shared in the human suffering and tragedy caused by disease could not endure their daily tasks for long if they were deprived of the hope offered by animal experiments, which had in the past solved so many problems.

Lord HAILEY said that the Research Defence Society, with which he had long been associated, were ready to admit that the present Act required in some measure to be brought up to date. But they would protest against any measure which would curtail the possibility of recourse to animal experiments which they regarded as essential to the progress of medicine and surgery. Lord CHORLEY pointed out that experiments had relieved not only men, but also other animals from much pain and suffering.

Lord CHESHAM, replying for the Government, pointed out that the Home Office, which was charged with administering the law, had no vested interest in research. Nobody could get a licence unless he had proper backing and the system of certificates which had been criticised was a further safeguard. To say that five inspectors had to cover 2½ million experiments might sound ridiculous, but surely the proper figure to which to relate the number of inspectors was to the number of places in which the experiments were carried out. The number of registered places in 1956 was 511 and Lord Chorley thought that number was not too great for the inspectors to cover. That there had been no prosecution under the Act since 1876 could fairly be regarded as a tribute to its successful working. Many cases of cruelty had, however, been brought under the Protection of Animals Act 1911, but no successful prosecution had ever been brought under it against anyone who held a vivisection licence. The department, he ended, would continue to be watchful that the law was properly carried out. If ever the law should prove inadequate, they would be the first to wish it amended.

## New Acts

Bills which have received the Royal Assent include the National Health Service (Amendment) Act, 1957, and the National Health Service Contributions Act, 1957. It is intended that the increased contributions to be introduced under this latter Act will begin on Sept. 2, and the revised estimates [1] for the service have been framed on that basis.

1. See *Lancet*, July 20, 1957, p. 141

## QUESTION TIME

### Senior Registrars

Mr. KENNETH ROBINSON asked the Minister of Health the total number of fourth-year and fully trained senior registrars in the National Health Service; and what was the number of additional consultant appointments, in terms of whole-time equivalents, made in the last twelve-month period for which figures are available.—Mr. J. K. VAUGHAN-MORGAN replied: At June, 1956, the number of senior registrars in England and Wales other than those in first to third year posts were as follows:

| | |
|---|---|
| In 4th year training | 136 |
| Completed 4 years of training and awaiting higher posts | 90 |
| Holding 5th and 6th year training posts in certain specialties | 13 |
| Holding part-time posts (most hold also other part-time posts as consultants or senior hospital medical or dental officers) | 26 |
| Holding, before July, 1948, hospital posts of unlimited tenure graded as senior registrar in July, 1948 | 17 |
| University staff holding honorary appointments in hospitals | 78 |
| Others holding miscellaneous appointments of a kind not included above | 40 |
| Doctors from overseas temporarily in this country and holding posts graded as senior registrar | 8 |
| | 408 |

It is estimated that in the year ending June 30, 1956, paid consultant appointments in England Wales increased by about 65 whole-time equivalents.

### Composite Packs

In answer to a question Mr. VAUGHAN-MORGAN said that the following composite packs were now available for the chronic sick at a single charge under the National Health Service:

Atomiser, smog mask, vaporiser, hypodermic syringe, urine sugar-analysis set, colostomy apparatus, suprapubic belt, douche, Higginson's enema syringe.

### Overtime in Mental Hospitals

Mr. ARTHUR BLENKINSOP asked the Minister what communication he had received from the Confederation of Health Service Employees regarding the working of overtime by mental-hospital staff.—Mr. VAUGHAN-MORGAN replied: The Confederation has informed me that it is banning overtime working by its nurse members in selected mental and mental-deficiency hospitals as from Sept. 1. I regret this, but I am confident that, should it be carried out, the hospitals concerned will do everything possible to minimise its effect on the services provided for patients.

### Snuff Taking

Mr. ROGER GRESHAM COOKE asked the Minister if he would consult the Medical Research Council for its advice on the taking of snuff as a safe alternative to smoking.—Mr. VAUGHAN-MORGAN replied: I am advised that although no relationship has been demonstrated between the taking of snuff and the incidence of lung cancer, there is insufficient evidence on the effects of this practice to justify it being recommended as a safe alternative to smoking. Some work undertaken in South Africa has suggested a possible connection between snuff taking and cancer of the nose among the Bantu.

### Caponised Chickens

Sir JOCELYN LUCAS asked the Minister of Agriculture, Fisheries and Food if he would request the Animal Health Trust or similar approved body to conduct an investigation into the effect on meat-eating animals of being fed with broth made from the necks of caponised chickens and the period of any resulting sterility after cessation of such a diet.—Mr. D. H. AMORY replied: I doubt whether a special investigation into this question is necessary. It is already known that the feeding of chicken necks which contained implants of synthetic œstrogens is dangerous, and a warning is given against the practice in the Ministry's advisory leaflet. I am considering whether additional publicity should be given to the warning already issued.

Lieut.-Colonel W. H. BROMLEY-DAVENPORT asked the Minister whether he would take steps under the Food and Drugs Act to oblige distributors of caponised chickens to indicate whether they have been caponised by the injection of hormone tablets.—Mr. AMORY replied: I am consulting the Minister of Health. Lieut.-Colonel BROMLEY-DAVENPORT:

Does my right hon. Friend not agree that if a housewife purchases a cockerel which has been killed early, in the neck of which the hormone pellet is still embedded, and if she then makes a soup or sauce out of the offal, including the head and neck, there must be some danger to the consumer?—Mr. AMORY: The Ministry leaflet makes it clear that there may be some risk to human health. The question in connection with which I am consulting with the Minister of Health is whether that risk is such as to make it desirable to provide additional safeguards to public health or possibly to make Regulations on the point.

### Broadmoor Patients

In answer to a question Mr. R. A. BUTLER, the Home Secretary, said that he would consider how far the principles embodied in the legislative proposals which resulted from the Government's consideration of the report of the Royal Commission on Mental Health could be reflected in the practice and legislation relating to Broadmoor patients. Broadmoor patients did, however, present special problems. They were not, for that reason, included in the commission's terms of reference and it would not in his view be appropriate to combine a revision of the law relating to Broadmoor patients with the revision of mental-health legislation arising out of the commission's report.

## Public Health

### Poliomyelitis

UNCORRECTED poliomyelitis notifications in the week ending July 13 (28th week of the year) were as follows (previous week in parentheses): paralytic 68 (68), non-paralytic 65 (65); total 133 (133). Thus, the figures remained entirely unchanged. This year's notifications have now fallen behind the total for 1950 up to the 28th week.

| *Year* | *Total cases up to and including 28th week* | *Cases in 28th week* |
|---|---|---|
| 1948 | 744 | 38 |
| 1949 | 748 | 117 |
| 1950 | 1659 | 212 |
| 1951 | 1027 | 120 |
| 1952 | 1014 | 119 |
| 1953 | 1423 | 223 |
| 1954 | 801 | 63 |
| 1955 | 795 | 120 |
| 1956 | 1054 | 107 |
| 1957 | 1657 | 133 |

An expert committee of the World Health Organisation has recommended large-scale trials of oral vaccine prepared from attenuated poliomyelitis virus.[1] In the committee's view such a vaccine can now safely be given wider trials, but under stringent precautions.

### Influenza

The liner *Orcades* docked at Tilbury on Monday after sailing from Sydney via Vancouver, Panama, and Trinidad. During the voyage there had been 92 cases of "Asian" influenza aboard,[2] and 5 passengers who had not fully recovered were taken to the Port of London isolation hospital at Gravesend. The outbreak began soon after the ship had left Panama. The illnesses were generally mild, lasting about three days. Before they went on their way, passengers were given yellow warning cards to send to their local medical officer of health should they fall ill with influenzal symptoms.

### Second Quarter in England and Wales

The Registrar-General has announced[3] provisional figures for the second quarter of 1957 in England and Wales. Live births numbered 185,390, giving a rate of 16·6 per 1000 population, the highest for a June quarter since 1951. 118,177 deaths were registered; the rate was 10·6 per 1000, compared with 10·8 and 11·2 in the corresponding quarters of 1956 and 1955. The infant-mortality rate was a new low record at 22·2 per 1000 live births; last year the corresponding rate was 23·0, and in 1938 it was 50·3. The stillbirth-rate also fell, from 22·8 last year to 22·5 per 1000 total births.

1. *Times*, July 22, 1957.
2. *Ibid*, July 23, 1957.
3. The Registrar-General's Weekly Return, no. 28, 1957. H.M. Stationery Office. 1*s*. 3*d*.

## Obituary

### JOHN PRESCOTT HEDLEY

M.A., M.Chir. Camb., F.R.C.P., F.R.C.S., F.R.C.O.G.

Dr. J. P. Hedley, consulting obstetric physician to St. Thomas's Hospital and senior treasurer of the General Medical Council, died on July 17 at the age of 81. His association with St. Thomas's as student, physician, and councillor was unbroken for nearly sixty years.

He was the son of Dr. John Hedley, J.P., of Middlesbrough. The family had a strong medical tradition, and in due course he followed his eldest brother, Edward Hedley, to Uppingham, King's College, Cambridge, and finally to St. Thomas's. After qualifying in 1902 he held a house-appointment at St. Thomas's and then at the Brompton Hospital. He returned to St. Thomas's as obstetric house-physician and later became R.M.O. of St. Thomas's Home. When the end of his tenure of this appointment was approaching an unexpected vacancy for obstetrical registrar arose. He was persuaded to apply and was soon embarked on his career as a specialist. To meet this new situation he returned to the examination hall and in rapid succession acquired appropriate higher qualifications—the M.R.C.P. in 1907 and the F.R.C.S. and M.CHIR. two years later. In 1910, when a new ward was opened at Thomas's which gave the obstetric department additional beds, he was appointed an assistant obstetric physician to the hospital. He also joined the staff of the General Lying-In Hospital, York Road.

[Elliott & Fry

During the early years of the 1914–18 war he worked at the Duchess of Westminster's Hospital at Le Touquet, and later he returned to St. Thomas's as one of the surgical specialists at the 5th London General Hospital. After the war, in 1919, he became obstetric physician to St. Thomas's, and two years later he was elected F.R.C.P. In 1928 he succeeded J. S. Fairbairn as head of the department. After he retired in 1936 he was elected to the council of the medical school.

Outside St. Thomas's one of his interests was the Society of Apothecaries. He had joined it in 1915 and in 1938 he was made a member of the court. His faithful attendance at meetings brought wisdom and balance to the deliberations of the court and its committees, and his talent for friendship made him a fine host on social occasions. He was master from 1944 to 1945.

From his association with the Society of Apothecaries many of his other interests fanned out. As its representative he was elected to the Central Midwives' Board in 1938. He examined for the board and for the six years before he retired in 1952 he was its vice-chairman. From 1939, also as a representative of the Society of Apothecaries, he sat on the General Medical Council, and at the time of his death he was the council's senior treasurer. The qualities which made him so valuable to the G.M.C. were also respected at the council meetings of the Medical Protection Society, of which he was long vice-chairman. Of this part of his work E. R. C. writes:

On the council of the society Dr. Hedley's wise advice, his unwavering adherence to principle, his sense of justice tempered by a keen sympathy for the man in trouble, in misfortune, or even in error, often provided the solution of a difficult problem. To the profession and to his friends he set a fine example.

Dr. Hedley was a fellow of all three Royal Colleges and he served the two older foundations well as examiner and adviser. To the youngest, of which he was a foundation fellow, he also gave six years of service as honorary treasurer. In whatever he did, he gained the affection of his associates, and he remained the same alert and friendly person to the end of his days.

A. J. W. writes:

All who knew him will remember him as a man of absolute integrity, a man who in all his dealings was completely

honourable. Usually quiet and perhaps retiring, the real Jock emerged when he considered that something was happening that was not completely above-board. Then he could and would be firm, and was most certain in his firmness. He was an able clinician in both obstetrics and gynæcology and held definite and wise views on the advantages of a little conservatism. His patients understood and loved him. They soon realised they were in the hands of someone whom they could respect and in whom they had complete confidence. He was an ideal teacher, for he could concentrate on those facts which mattered and express himself so simply that the subject was remembered. He taught from his own experience, which was gained not only from his hospital but also from an extensive private practice. He was invariably kind and polite to all and in consequence was one of the most approachable members of the staff.

It would be true to say that his life centred on his home and family—he had five sons and a daughter—and he never got over the loss of his wife in 1945. He loved the country and its simpler pursuits. He enjoyed working in his garden and politely resented any interruption to his well-earned weekend break. Generations of St. Thomas's men, and especially those who had the wisdom to play cricket, will never forget the delightful days spent at one of his two second homes in Surrey. Following the annual match against Cobham they knew that more was to come in the wonderful and spontaneous hospitality they would get from Mrs. Jock and Jock. All were welcome and it seemed that numbers did not matter at all.

Jock was universally liked and respected, and seldom could anyone have had fewer enemies. He was much loved at St. Thomas's, where he will be greatly missed. Though he would be the last to acknowledge it, he was a most distinguished man.

## ALAN GREGG

**M.D. Harvard**

Dr. Alan Gregg, who died at his home at Big Sur, California, on June 19 at the age of 67, had influenced the pattern of medical education in many countries. During most of his professional life, he served on the staff of the Rockefeller Foundation, where from 1951 until his retirement in 1956 he held the position of vice-president.

Qualifying at Harvard in 1916, he spent a year as clinical intern at the Massachusetts General Hospital, where he began to appreciate the importance of preventive medicine. He was distressed by the flow of patients in advanced chronic illness, for whom little or nothing could be done. As he later put it, "What we were doing—indeed, much of what medicine could do then—seemed to me to be patchwork. My view of preventive medicine seemed to offer something a little less of the *ex post facto*."

*John Brook*

At the end of his internship, he volunteered to serve with the Harvard medical unit which during the first world war was attached to the British Expeditionary Force, and he served with the Royal Army Medical Corps until the end of the war. These early years of hospital and military service were to be the only ones he spent in the clinical practice of medicine. He had already become convinced that the way to bring medical knowledge to bear on the prevention of illness lay through the evolution of more advanced techniques in public-health practice. While he was still at Harvard, he had been interviewed by Mr. Wickliffe Rose, who was seeking promising young men for the new International Health Board of the Rockefeller Foundation. Gregg had promised that he would report for duty with the board on the end of the war, and a few weeks after demobilisation, he was assigned to Brazil to take part in a campaign for the control of hookworm.

At this period, the Foundation had come to realise that the standards of public health in a country could not rise above the level of medical education in that country, and the decision was made to launch a programme for the improvement of medical education in certain foreign countries to complement the campaign of the general education board to improve medical education in the United States. A new division of medical education was formed and Dr. Gregg was invited to serve as its associate director. In 1923 he went to Paris where he spent the next seven years administering a system of fellowships and grants for European medical schools. Among others, the University College Hospital, London, the Universities of Oxford and Cambridge, and the University of Edinburgh were assisted in developing their new concepts of clinical teaching based on fundamental research. In 1930 the increasing emphasis on the scientific content in medical teaching and practice led the Foundation to change the title of the division of medical education to the division of medical sciences, and Dr. Gregg became its director.

Of the years Gregg held this office, and that of vice-president, J. C. B., a colleague, writes:

They were years of rich fulfilment in the medical sciences programme. Research was encouraged in the clinical uses of prontosil and sulphanilamide. Substantial support to investigators working in the fields of endocrinology and human genetics was given. Biochemical concepts of disease were encouraged. But probably the most significant contribution of this period was the launching of a broad programme in psychiatry, until that time one of the most retarded of the medical fields. As related by Raymond Fosdick, who was president of the Foundation during this period, the concept was broad, embracing neurology and psychology, and had its fringes in the social sciences and even in ethics. "I should not be satisfied with the definition of psychiatry as that specialty in medicine which deals with mental disorders," said Gregg. "Like a bad newspaper headline, such a definition confines while condensing and misrepresents by oversimplifying. Psychiatry deals also with the emotional and social life of man. . . . (Its) province is the conduct of man, his reactions, his behaviour as an indivisible sentient being with other such beings."

Substantial grants were made to institutions in the United States, Canada, and Europe. In Great Britain, research was supported in neurosurgery and psychiatry at the University of Edinburgh, the London Hospital, the Tavistock Clinic, and the National Hospital for Diseases of the Nervous System in London, in neurophysiology at Cambridge University, and in human heredity at the Galton Laboratory at University College.

As his experience advanced, Dr. Gregg was increasingly called upon for his advice in connection with governmental programmes. During the second world war and subsequently, he served on many committees or as a consultant to branches of government concerned with medical matters. From his long experience with the problems of advancing human welfare in the medical field, he was able to make outstanding contributions to the solutions of troublesome questions involving the effective use of medical man-power and advancement of governmental services in a society devoted to the freedom of action and choice of the individual. On occasion his services were requested by other governments in matters calling for great scientific comprehension combined with a deep understanding of the associated human problems.

He was concerned that the newly released nuclear energy should be effectively employed for its maximum human benefit, and he served as the first chairman of the Advisory Committee for Biology and Medicine of the U.S. Atomic Energy Commission from its beginning in 1947 until 1953. He was highly influential in guiding the commission's programme into the broad areas of the life sciences that it has continued to explore. A steadily expanding programme of research in general biology, agriculture, and medicine was initiated which extended into special clinical interests. Centres for the investigation of the uses of nuclear reactions in the pathology, diagnosis, and therapy of cancer were established, chiefly at universities. There was consistently maintained a climate of scientific and intellectual freedom and initiative in a nation-wide programme supported predominantly by government.

He is survived by his widow and four children, all of the latter having followed academic pursuits. Medicine, biology, classical and modern languages and literature—all the lively intellectual interests of the father are continued in his family. The tributes to the life of Alan

Gregg lie not so much in the beauty and artistry of his writing and the incisiveness of his thought, as moving as these are, but rather in the creativeness of the many persons who were profoundly influenced by him at the most responsive moments of their lives.

### JOHN DRAKE LUCAS REINHOLD
**M.A., D.M. Oxfd, M.R.C.P., D.C.H.**

Dr. John Reinhold was fatally injured in a motor accident last week, ten days after arriving in Denver to take up his appointment as assistant professor of pædiatrics in the University of Colorado.

He was born in India, the second son of Colonel C. H. Reinhold, M.C., of the Indian Medical Service, and educated at Wellington and Oxford, where he was a half-blue and a member of Vincent's. He proceeded to Guy's Hospital and qualified in 1945. His house-appointment there was broken by temporary ill health, and subsequently he spent a short time in general practice before settling down to pædiatrics. He became M.R.C.P. in 1947, and earlier this year he received the D.M.

P. R. E. writes:

The loss to his family, to his friends, and to medicine is immeasurable. A first-class clinician, he also applied his excellent brain to research: at the Canadian Red Cross Hospital at Taplow he investigated the anæmia of acute rheumatism; during a resident appointment in Boston he collaborated in observations on the optimum dosage of digoxin in children; he shared responsibility for the home care of sick children based on St. Mary's Hospital, Paddington, and during the same period he conducted a phonocardiographic analysis of heart sounds and murmurs at Great Ormond Street—work which he continued when he returned to Guy's as assistant to the director of the department of child health. When he died he was only 34, but his later work takes its place as part of the permanent fabric of medical knowledge.

Tall, spare, active, erudite, and reserved, his slightly remote manner would from time to time change suddenly into a quiet and endearing geniality. A delightful and constantly helpful colleague, his friends knew him as witty, hospitable, a modest judge of wine; but he was happiest at home with his young family.

## Appointments

BRADSHAW, GLADYS V., M.B. Lond., D.OBST.: senior assistant M.O. and school M.O., Todmorden, Hebden Royd, Ripponden, Hepton, and Sowerby Bridge.
BURN, A. T., T.D., M.B. Durh., D.P.H.: M.O.H. and divisional M.O., Pudsey, Aireborough, Horsforth, Ilkley, Otley, and Wharfedale.
MACGREGOR, D. McC., M.B. Glasg., D.P.M.: psychiatrist (S.H.M.O.), Fife mental hospitals, Stratheden, Cupar, Fife.
MICHELL, E. P. G., M.B. Camb., M.R.C.P., D.C.H.: senior registrar in child psychiatry, Tavistock Clinic, London.

**The Hospital for Sick Children, Great Ormond Street, London:**

BARTON, MARGARET E., M.B. Camb.: house-physician.
BURHMANN, MAATJIE V., M.B. Cape Town, D.P.H., D.P.M.: part-time registrar, department of psychological medicine.
CASEY, NORA E., L.R.C.P.I.: assistant resident M.O., Tadworth.
KINSBOURNE, MARCEL, B.M. Oxfd, M.R.C.P.: house-physician.
MITCHELL, MYRTLE E., M.B. Lond.: house-surgeon.
THOMAS, H. T., M.B. Camb.: resident officer, neurological and neurosurgical department.

**Colonial Appointments:**

FRANKLIN, S. O. O., M.B. Dubl.: senior M.O., Western Region, Nigeria.
JEFFERY, G. A., M.B. Birm., D.T.M. & H.: M.O., Tanganyika.
MELVILLE, H. A. H., M.B. Wales, D.OBST.: M.O. (grade A), Barbados.
MORRIS, H. V., M.D., L.M.S. Newfld: surgical registrar, Barbados.
O'LEARY, T. K., L.A.H. Dubl.: M.O., Uganda.
PANOS, Z. G., M.B. Athens, D.P.H.: assistant director of medical services, Cyprus.
SEEGOBIN, J., M.D., D.T.M. & H.: medical superintendent, Mauritius.
TA-MIN, W. F., M.B. Leeds: M.O., Mauritius.
WALLER, CHARLES, M.R.C.S., D.A.: M.O. (grade B) (anæsthetist), Trinidad.
WILLIAMS, A. E. O., F.R.C.S.I.: surgeon specialist, Sierra Leone.

## Births, Marriages, and Deaths

### BIRTHS

CROSSLING.—On July 20, at Robroyston Hospital, Glasgow, to Margaret (née Abdy), wife of Frank Crossling, F.R.C.S.—a son.
KENYON.—On June 7, at University College Hospital, London, to Nuala (née Gilmore), M.B., and W. Islay Kenyon, M.R.C.P.—a second son, Niall Vincent.

## Notes and News

### MENTAL ILLNESS IN SCOTLAND

IN Scotland, the work of the mental-health services continues to increase.[1] Last year 9200 patients were admitted to mental hospitals, some more than once. Compared with the previous year, the number of admissions of certified patients rose, and the number of voluntary admissions rose even more, to a record proportion of 73%. By the end of the year there were 20,925 patients in the hospitals—an increase of 152 during the year. Despite extensions to National Health Service and other institutions for mental defectives, the shortage of accommodation for them is still described as acute. There has been some increase in the number of physicians, but against this was an increase in the demands for outpatient and domiciliary work. Female and student nurses were scarce, but the number of qualified male nurses was satisfactory and the standards of nursing were high. Patients in private care were visited; and their condition was in general improving.

In treatment and reablement, tranquillising drugs were still under investigation, and the main emphasis was on the increasing tendency towards allowing patients to lead a more normal life. Doors have been unlocked, parole and weekend leave more freely granted, and outside employment allowed. Wards have been redecorated and catering improved. Bedridden patients have been set on their feet. Occupational therapy has included practical projects in the hospital grounds, and there has been more emphasis on group psychotherapy and discussions, recreation (including games, gramophone records, and television), and instruction, such as cookery classes. All this has made a contribution to treatment as well as to the well-being of patients.

### BRITISH EMPIRE SOCIETY FOR THE BLIND

SEVEN years ago the British Empire Society for the Blind was established. Its first task was to mobilise interest and encourage a local organisation in each area where one was needed. World events have moved swiftly; colonies have achieved dominion status, and older dominions (such as Canada) are sharing the burden. In its annual report[2] for 1956–57, which mentions that the society proposes to change its title to the British Commonwealth Society for the Blind, it can claim that events in its own field have moved equally swiftly. The initial stage of organisation is now over, and the emphasis today is on the two practical aspects: the prevention and cure of blindness, and the training of blind people to do useful work and take their place in the community; till recently, the likely fate for most of them was to beg a living.

The most spectacular achievement is the work on river blindness (onchocerciasis) in West Africa, the subject of a book by Dr. Geoffrey Crisp, to which we have lately referred.[3] Onchocerciasis is the major cause of the blindness which afflicts 400,000 people in British West Africa. The research already done indicates the importance of the simulium fly as a vector, and the value of drugs as suppressants when given early, of intravenous protein injections in acute attacks, and of massive doses of vitamin A in selected cases. A degree of immunity exists and this raises hope that artificial immunisation may become possible. A relatively cheap plan of attack on simulium has been devised, and a pilot scheme will be started in Ghana this year. The society is promoting further research, as well as propaganda for simple hygiene and the establishment of eye hospitals and clinics, both of which can do much to mitigate the disease. Another investigation, in Central Africa, showed that certain tribal practices during the treatment of measles have led to the blinding of very many children. These practices are now being discouraged.

Many training schemes are in operation, and already many blind farm-workers are doing productive work. Fishing and manufacture are other occupations in which the blind have been instructed, and the adaptation of Braille to every written language has made even clerical training feasible. In many cases the blind pupils have built their own classrooms, workshops, and hostels.

1. Report of General Board of Control for Scotland for the year 1956. H.M. Stationery Office. 1957. Pp. 20. 1s. 3d.
2. British Empire Society for the Blind. Annual Report for the Year Ending March 31, 1957. Pp. 45. Obtainable from the Society at 121, Victoria Street, London, S.W.1.
3. *Lancet*, 1957, i, 1176.

Introducing the report, Lord Halifax, president of the society, pointed to the informal links of human sympathy from which the Commonwealth draws strength. Such links are exemplified by the society, for its aim is a Commonwealth in which blindness is rare, and in which the blind can take their place as self-respecting and self-supporting citizens.

## PREDICTION METHODS AND BORSTAL TRAINING

PSYCHIATRISTS with memories of the problems of selecting officers or air crew during the war will sympathise with the perplexity of officers of the courts who are asked to foretell the behaviour of young men after borstal training. As in psychiatry, the purely intuitive clinical approach has limitations which become apparent when these prognostic judgments are checked against subsequent recidivism. Some attempts, notably by the Gluecks in Massachusetts, have been made to use a system of weighting biographical data to give a score which will predict the likelihood of criminal behaviour in the future.

A book [1] by a criminologist and a statistician aims at the rigorous development of a scheme for synthesising the facts of previous personal history of the borstal boy to give the most accurate and sensitive indicator of his future. Such schemes must be simple as well as efficient, reliable or consistent as well as valid, and Mannheim and Wilkins give their reasons for believing that their system has all these desirable qualities. As they point out, the proving of any prognostic test depends on an adequate follow-up: it is not enough to show that certain items of past experience are statistically related to recidivism in a sample of former borstal boys. Strictly speaking, even follow-up procedures depend for their validity on a reasonable equality in the circumstances of life in all members of the tested group. But this can be safely assumed and the results obtained in practice appear to justify the authors' confidence.

Those with clinical leanings may be repelled by this apparently mechanistic technique, but the firmly scientific attitude preserved throughout the book is vindicated by the prognostic success achieved. A chapter giving full case-histories will gild the pill for the intuitive psychologist and make more acceptable a text which should serve as a useful work of guidance and reference to doctors or laymen interested in the prediction of human behaviour.

### University of Oxford

Dr. P. J. R. Phizackerley has been appointed to the Betty Brookes research followship.

### University of Leeds

Dr. J. G. Leopold has been appointed lecturer in pathology.

### Royal College of Surgeons of Edinburgh

At a meeting of the college held on July 10, with Sir Walter Mercer, the president, in the chair, the honorary fellowship was conferred on Sir Stanford Cade and Sir Geoffrey Jefferson, F.R.S. The following were admitted to the fellowship:

Rafid Subhi Adib, L. C. A. Ariotti, Narindar Singh Brara, C. A. Cass, William Cochran, J. G. Connolly, W. N. de Vos, P. L. C. Diggory, H. H. Goosman, E. J. Hargadon, J. H. Hodgson, Muneer Hussain, G. A. Jose, Eric Kreft, L. J. G. Kruger, R. I. Lindfield, Samir Fouad Massoud, A. W. Maxwell, J. P. O'Neill, D. L. E. Paine, D. A. Peebles-Brown, G. R. G. Prendiville, Ziaur Rahman, Tirunagari Rangiah, A. L. Rencken, Ann L. Reynolds, A. A. Robertson, J. G. Robertson, Laifungbam Nanda Babu Roy, P. M. Segelov, Mihir Kumar Senapati Feroz Shah, Kedar Nath Sharma, H. U. Shaw, Rosalind A. Shearer, Gajanan Hari Tilak, Maung Shwe Tin, Dhirajlal C. Vora, J. R. Watson, R. A. Williams, R. O. Wise, Kenneth Wood.

### Royal Society of Health

The fellowship of this society has been conferred on the following:

Dr. Ralph G. Beachley, director of public health, Arlington County, Virginia; Dr. F. H. N. Cruchley, medical officer in charge, public health training centre, Jamaica; Dr. S. E. L. Ferreira, A.D.M.S., Jamaica; Dr. Edwin Gray, M.O.H., Runcorn; Dr. R. E. Lane, professor of occupational health, Manchester University; and Dr. J. H. Weir, M.O.H., Kensington and Chelsea.

### Royal Institute of Public Health and Hygiene

Dr. Louis Zizine, of Paris, is to give the Benguć lecture at the institute, 28, Portland Place, London, W.1, on Wednesday, Oct. 9, at 4 P.M. He is to speak on the endocrine problems of asthma.

1. Prediction Methods in relation to Borstal Training. By HERMANN MANNHEIM and LESLIE T. WILKINS. H.M. Stationery Office. 1955. 17s. 6d.

### University of Edinburgh

The title of professor emeritus has been conferred on Prof. W. M. Mitchell, M.B., who holds the chair of veterinary surgery. Dr. R. H. A. Swain, senior lecturer in the department of bacteriology, has been appointed reader in virology.

On July 17 the following degrees and diplomas were conferred:

*M.D.*—M. F. Oliver, *J. A. Owen (gold medal for thesis); W. W. Park, P. D. Stewart (commended for thesis); Robert Brown.

*Ph.D. (in the faculty of medicine).*—D. L. Gardner, E. A. Harris, *Margarethe M. A. Holzbauer.

*M.B., Ch.B.*—D. C. Flenley, I. B. Macleod, W. A. Souter, R. J. Wilson (honours); Oyedokun Ajayi-Obe, Frances C. Bailey, J. H. Barber, H. G. S. Battersby, E. D. Bauld, Peter Beaglehole, M. R. Bewsher, Geoffrey Birshall, J. A. Birkbeck, J. B. McK. Black, I. A. R. Brown, P. W. Brown, N. T. A. Byam, F. N. Campbell, J. M. B. Carr, Dorothy Child, Joyce C. Clapperton, J. H. Cochrane, Margaret W. Coleman, G. F. N. Collins, Patricia E. McH. Curran, William Dodd, Jean M. D. Dott, Heather M. Douglas, J. M. Duncan, J. I. Evans, A. M. Forbes, Phyllis M. Fulton, A. McL. Geddes, Elspeth M. Gibson, Jennifer M. R. Gilchrist, I. H. Gravelle, Thomas Harcus, D. N. Harkness, J. D. A. Henshaw, J. H. J. Higgins, Audrey D. Hill, Margaret J. Hutchinson, Ronald Hutchison, Peter Johnson, D. A. R. King, W. K. Kirkwood, H. MacG. Kohler, Dorothy Lee, A. B. Leys, Nesta E. Lloyd, J. R. Macaulay, Mollie J. McCallum, Kirstine Macdonald-Smith, Elizabeth J. MacDougall, D. G. McDowall, A. B. Macintyre, A. D. MacKenzie, Johan MacKinnon, Jean McLean, D. M. Macleod, Hugh Macmaster, W. R. MacRae, Margaret McL. Manderson, A. G. Meikle, Margaret J. Millar, P. R. Monk, G. M. Morley, Murdoch Murchison, Donald Murray, J. A. Murray, Clair Nelson, H. O. Nicholson, R. H. W. Park, Clive Parker, Jean M. Parsons, Alexander Paterson, G. M. Paterson, H. M. K. Peddie, P. C. Phellas, J. K. Phillips, Herbert Pullen, J. B. Rae, D. O. C. Rapier, Joyce E. Richardson, Mary M. Roberts, A. A. Russell, D. F. Scott, R. S. Scott, J. H. Shelley, Hamish Simpson, D. J. Sinclair, Gerard Slavin, Frances Smith, W. M. Steel, Brenda M. Stewart, J. B. Stewart, D. G. Strachan, Peter Sutherland, Elizabeth M. Swanson, Bruin Tammes, R. C. Telfer, D. E. L. Temple, G. M. Thomas, Ved Parkash Varma, James Wightman, A. M. Wilkie, Michael Woodliff.

*D.P.H.*—I. C. Brannen, I. F. Craik, I. B. C. Eckford, G. I. Forbes, Adhir Kumar Ganguly, C. W. G. Irvine, Pensri Khanjanasthiti, M. H. Lack, H. C. Lindsay, Mary I. McArthur, R. D. G. MacLennan, J. L. McLetchie, Catherine H. Mair, G. A. Scott, M. S. Warwick, Leila M. Watson, A. V. Wells.

*D.T.M. & H.*—Rathna Vasant Kumar Alwa, Jibon Chandra Barua, Susan Benjamin, Muthyala Chinna Pulliah Chetty, Hamilton Currie, Kali Kumar Das, Naranjan Singh Dhillon, Davendra Nath Gupta, Iqbal Ahmed Hashimi, Manayath Kottayam Ragavan Jayachandran, Mohamad Rafi Khan, Gopala Kuppuswamy, G. Y. McCririck, J. A. McLaren, Nalapat Kesava Menon, Maung Hla Myint, R. S. Nagle, E. L. Szlamp.

* In absentia.

### International Congress of Allergology

The third International Congress of Allergology will be held in Paris from Oct. 19 to 26, 1958. Further particulars may be had from Dr. B. N. Halpern, 197, Bd. St. Germain Paris 7e.

### Ministry of Health

The Minister of Health has appointed Miss Kathleen Raven, matron of the General Infirmary, Leeds, to be deputy chief nursing officer in succession to Miss M. G. Lawson, M.B., who has retired.

### British Medical Association

The association's annual dinner was held on July 16 in Newcastle's 18th-century Old Assembly Rooms. Mr. Weldon Watts, the new president, spoke of the doctor's desire to work for the good of his patient without interference. He believed that the profession's recent difference of opinion with the Government "might yet be for our good" if it led ultimately to a more satisfactory settlement. He urged the profession to unite for the good of the community as a whole, and encouraged the younger members to take a more active interest in medical politics because decisions to be taken in the near future would be of great import for many years to come. The President and The B.M.A. was elegantly proposed by Lord Runciman, and Dr. Solomon Wand welcomed The Guests, on whose behalf the Lord Mayor of Newcastle and Dr. S. C. Sen, of the Indian Medical Association, replied.

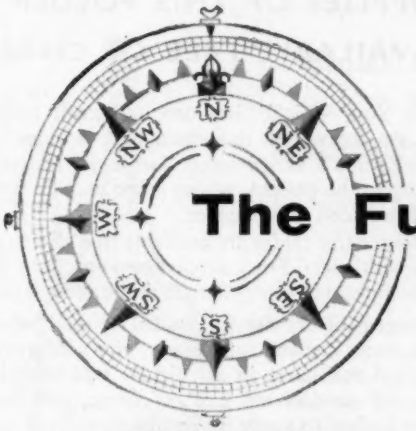
Prof. Robert Cruickshank has left for a lecture tour in Australia and New Zealand. He will be away till Aug. 31.

Mr. Terence Cawthorne is to read a paper at the meeting of the Medical Association of South Africa which is being held in Durban in September.

Dr. Geoffrey Furness has been appointed visiting lecturer in the department of microbiology, University of Pittsburgh, for 1957–58.

Dr. Derrick Rowley has been appointed visiting professor in the department of medical microbiology, Stanford University, California, for 1957–58.

Dr. Richard Scott is to be one of a party of doctors who are to visit medical schools and institutions in Dresden and other centres in East Germany during September.

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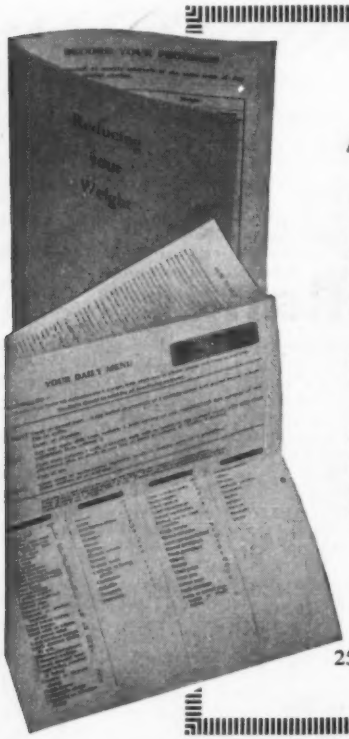

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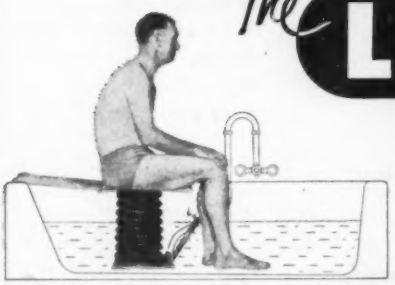
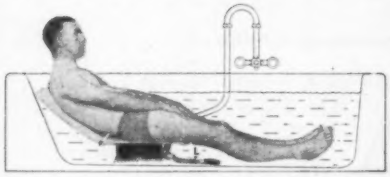


*The patient first sits on the platform with his feet on the floor and then raises his legs until he can lift them over the edge into the bath.*



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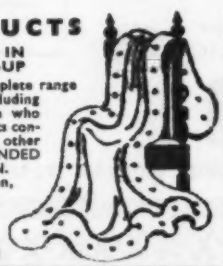

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Further particulars may be obtained from the Secretary of the Medical School, to whom applications, giving full particulars of age, qualifications and experience, together with the names of 3 referees, should be sent before Saturday, 14th September, 1957.

**NEWCASTLE REGIONAL HOSPITAL BOARD. Nuffield** RESEARCH FELLOWSHIP in Geriatric Unit (176 Beds), General Hospital, Sunderland. Whole-time appointment for period of 2–3 years. Salary £1000 p.a. Further particulars from Consultant Physician, Geriatric Unit, General Hospital, Sunderland.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 28 days.

**UNIVERSITY OF BIRMINGHAM. Faculty of Medicine.** DEPARTMENT OF ANATOMY (Director, Sir SOLLY ZUCKERMAN, F.R.S.). Applications are invited :—

(1) From medically qualified candidates for the post of SENIOR LECTURER (Pre-clinical) IN ANATOMY. Salary according to qualifications and experience in the range £1550–£2150.

(2) For the post of SENIOR LECTURER (non-medical) with interests in the general field of Endocrine- and Histo-chemistry. Salary according to qualifications and experience in the range £1450–£2050.

Applications (6 copies), together with the names of 3 referees, should be sent not later than 30th September, 1957, to the Assistant Registrar, Medical School, Birmingham, 15, from whom further particulars may be obtained.

**THE UNIVERSITY OF MANCHESTER. Darbishire** HOUSE HEALTH CENTRE. Applications are invited for the appointment of ASSISTANT GENERAL PRACTITIONER at the Darbishire House Health Centre in Upper Brook-street and High-street, Manchester, for a period of 12 months beginning 1st October, 1957. The work entails assisting the 4 General Practitioners in the Centre in which about 12,000 patients are at present registered. The Health Centre is also used in the teaching of Medical Students of the University. Salary at the rate of £1000 p.a., with an allowance towards the cost of travelling expenses and superannuation.

Applications, which should include full particulars of qualifications and experience, must reach the Registrar, the University, Manchester, 13, not later than 7th August, 1957, and should give the names of not more than 3 persons to whom reference may be made.

**UNIVERSITY OF SOUTHAMPTON. Applications are** invited for the post of LECTURER or ASSISTANT LECTURER IN BIOCHEMISTRY in the Department of Physiology and Biochemistry. Salary scale £900–£50–£1350–£75–£1650 for Lecturer and £700–£50–£850 for Assistant Lecturer, with placing on scale according to qualifications and experience. F.S.S.U. and children's allowances. Higher degree in biochemistry or physiology essential.

Further particulars should be obtained from the Secretary and Registrar, to whom applications (6 copies) should be sent not later than 7th September, 1957.

**UNIVERSITY OF LONDON (British Postgraduate** MEDICAL FEDERATION), INSTITUTE OF NEUROLOGY (Queen-square). Applications are invited for the post of PHYSIOLOGIST in the Respiratory Unit at The National Hospital, Queen-square. The post provides opportunity for the study of problems of respiratory physiology and of the effects of respiratory failure on nervous function. The salary scale is at present under review but will probably start at £1100 p.a. for a medically qualified applicant and at £900 p.a. for a non-medically qualified applicant. Superannuation will be arranged.

Applications, together with the names of 3 referees, should be sent to the Secretary, Institute of Neurology, The National Hospital, Queen-square, W.C.1, not later than 10th August, 1957.

**THE UNIVERSITY OF SHEFFIELD. Applications are** invited for a Part-time RESEARCH ASSISTANT IN CHILD HEALTH to assist in an investigation in the prevention of tuberculosis in children, to begin duties on 1st October, 1957. The appointment will be for 1 year in the first instance and the duties of the post will occupy 4 half-days a week. Salary 12 guineas a week.

Further particulars should be obtained from the Registrar with whom applications (3 copies) should be lodged by 10th August, 1957.

**UNIVERSITY OF BELFAST. The Senate of The Queen's** University of Belfast invites applications for the CHAIR OF SOCIAL AND PREVENTIVE MEDICINE (following the resignation of Prof. A. C. Stevenson).

The closing date is 14th September, and further particulars may be obtained from the Secretary of the University.

**UNIVERSITY OF CAPE TOWN. Applications are** invited for the post of DEAN OF THE FACULTY OF MEDICINE. The appointment will be made under the terms of the joint staff agreement between the University and the Provincial Administration of the Cape of Good Hope. The post is a full-time one and the incumbent is not permitted to undertake remunerative private work. The Dean must have a medical qualification ; he has the status of a professor and is a member of the Senate. The salary is £2688 p.a. plus a temporary cost-of-living allowance for a married man (at present £234 p.a.).

Applications should state age, qualifications, and experience in teaching or administrative work concerned with medical education, and should give the names of 2 referees. 2 copies of the application must reach the Secretary, Association of Universities of the British Commonwealth, 36, Gordon-square, London, W.C.1 (from whom a memorandum giving the conditions of appointment should be obtained) by 31st August, 1957. A third copy must be sent direct by air-mail to the Registrar, University of Cape Town, Private Bag, Rondebosch, Cape Town, South Africa, by the same date.

The University reserves the right to appoint a person other than 1 of the applicants or else to make no appointment.

**UNIVERSITY OF CAPE TOWN/PROVINCIAL ADMINI-**STRATION OF THE CAPE OF GOOD HOPE. Joint Medical Staff. Applications are invited for the CHAIR OF BACTERIOLOGY in the University of Cape Town. The appointment will be made under the terms of the Joint Staff agreement between the University of Cape Town and the Provincial Administration of the Cape of Good Hope. It is a full-time appointment and the occupant of the Chair is not permitted to undertake remunerative private work. The salary is £2688 p.a., plus a temporary cost-of-living allowance for a married man (at present £234 p.a.).

Applications should state age, experience, qualifications, publications and research interests, and should give the names of 2 referees. 2 copies of the application must reach the Secretary, Association of Universities of the British Commonwealth, 36, Gordon-square, London, W.C.1 (from whom a memorandum giving the conditions of appointment should be obtained), not later than 31st August, 1957. A third copy must be sent direct by air-mail to the Registrar, University of Cape Town, Private Bag, Rondebosch, Cape Town, South Africa, by the same date.

The University reserves the right to appoint a person other than 1 of the applicants or else to make no appointment.

## Hospital Services : Senior Appointments

**MIDDLESEX HOSPITAL, W.1. Applications invited for** post of Full-time ASSISTANT in the Department of X-ray Diagnosis with salary on the scale £1653 15s.–£2126 5s.

Applications, naming 2 referees, should be sent to the Deputy Superintendent by 17th August.

**LIVERPOOL REGIONAL HOSPITAL BOARD. Appli**cations are invited for the 2 posts of Whole-time ASSISTANT RADIOTHERAPIST (Senior Hospital Medical Officer) to work under the guidance of the Director of Radiotherapeutic Services at the Radium Institute, from whom any further information may be obtained. Applicants must possess a Diploma in Radiology and have previous experience in radiotherapy. Preference will be given to candidates holding the F.F.R. or other higher qualification.

Forms of application from Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 19, James-street, Liverpool, 2, to be returned not later than 17th August, 1957.

VINCENT COLLINGE, Secretary to the Board.

**LIVERPOOL REGIONAL HOSPITAL BOARD. Whiston** AND RAINHILL HOSPITALS. Applications are invited for the post of CONSULTANT PATHOLOGIST (whole-time or maximum part-time sessions) with duties at the above hospitals. Applicants should possess a higher qualification and should have at least 5 years experience in clinical pathology including at least 3 years in hospital pathology.

Forms of application from Dr. T. Lloyd Hughes, Senior Administrative Medical Officer, Liverpool Regional Hospital Board, 19, James-street, Liverpool, 2, to be returned not later than 17th August, 1957.

VINCENT COLLINGE, Secretary to the Board.

**LIVERPOOL. THE UNITED LIVERPOOL HOSPITALS.** LIVERPOOL REGIONAL HOSPITAL BOARD. Applications are invited for appointment as CONSULTANT PÆDIATRICIAN for 4 notional half-days to The United Liverpool Hospitals and the Liverpool Regional Hospital Board. The appointment is for 3 notional half-days a week for duty in The United Liverpool Hospitals, in the first instance at the Royal Liverpool Children's Hospital, and for 1 notional half-day a week for duty with the Liverpool Regional Hospital Board, in the first instance at Broadgreen Hospital, in neonatal pædiatrics. Candidates must possess a registrable qualification and F.R.C.P. or M.R.C.P. (London, Edinburgh or Ireland).

Applications, giving full particulars of age, qualifications, &c., and details of present and previous appointments, together with the names of 3 persons to whom reference may be made, should reach the Secretary, The United Liverpool Hospitals, 80, Rodney-street, Liverpool, 1, by 14th August, 1957.

**BIRMINGHAM REGIONAL HOSPITAL BOARD.** Whole-time or maximum Part-time Locum CONSULTANT SURGEON, Hallam Hospital (105 surgical beds). Vacant 10th August for several months. Wide experience specialty/higher qualification required.

Apply immediately to Secretary, 10, Augustus-road, Birmingham, 15.

**BIRMINGHAM REGIONAL HOSPITAL BOARD.**

Part-time CONSULTANT RADIOLOGIST (6 notional half-days weekly). Duties at hospitals within the Burton-on-Trent Group. Wide experience specialty/higher qualification required.

Whole-time CONSULTANT PÆDIATRICIAN. Duties mainly at Dudley Road Hospital and associated hospitals. Wide experience specialty/higher qualification required. Dudley Road Hospital is recognised by the University of Birmingham for clinical (pædiatric) instruction.

Applications (15 copies), stating name, age, nationality, qualifications, present and previous appointments and details of 3 referees, to Secretary, 10, Augustus-road, Birmingham, 15, by 26th August, 1957.

**MANCHESTER REGIONAL HOSPITAL BOARD.** Whole-time NON-RESIDENT ASSISTANT RADIOLOGIST (Senior Hospital Medical Officer), Burnley and District Hospital Centre, mainly at the Victoria Hospital, Burnley, but including duties at Burnley General and Reedyford Memorial Hospitals. Good experience and higher qualifications required; appointee to live in or near Burnley.

Application forms from the Senior Administrative Medical Officer to the Board, Cheetwood-road, Manchester, 8, to be returned by 12th August, 1957.

**NORTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.**

Part-time CONSULTANT PSYCHIATRIST to South-East Essex Child Guidance Clinic, 119–121, Honeypot-lane, Basildon, for 2 sessions a week (new clinic in developing area). Further particulars on application.

Part-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) at Romford Child Guidance Clinic, 62, Western-road, Romford, Essex, for 2 sessions a week (newly established to serve Romford and Dagenham areas).

Part-time ASSISTANT PSYCHIATRIST (Senior Hospital Medical Officer grade) at South Essex Child Guidance Clinic, Whitchurch-lane, Grays, for 2 sessions a week.

Applications (6 copies), stating post(s) concerned, and names of 3 referees, should reach the Secretary, 11A, Portland-place, London, W.1, by Saturday, 24th August.

**NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.**

(1) CONSULTANT PSYCHIATRIST, 2 half-days per week for work with parents at "High Wick," Tyttenhanger, St. Albans, Herts. (Approximately 20 Beds for psychotic and maladjusted children 3–10 years old.) Preference will be given to suitably qualified Male candidate with interest in research. Unit may be visited by direct appointment.

Applications before 28th August, 1957.

(2) CONSULTANT ANÆSTHETIST, 7 half-days a week—4 half-days at West Herts Hospital, Hemel Hempstead, Herts (160 Beds), and 3 half-days at the Watford Hospitals (Peace Memorial, 208 Beds; Shrodells, 386 Beds; Watford Maternity, 58 Beds). Hospitals may be visited by direct appointment.

Applications before 4th September, 1957.

Application forms obtainable from, and returnable to, Secretary, North West Metropolitan Regional Hospital Board, 11A, Portland-place, W.1.

**SHEFFIELD REGIONAL HOSPITAL BOARD.** Whole-time SENIOR ASSISTANT PSYCHIATRIST required for Carlton Hayes Hospital, Narborough, near Leicester. Single accommodation available. Salary £1653 15s.–£52 10s.–£2126 5s.

Application forms and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 24th August, 1957.

**AUSTRALIA. ROYAL SOUTH SYDNEY HOSPITAL,** Joynton-avenue, ZETLAND, SYDNEY, NEW SOUTH WALES, AUSTRALIA. (Acute Hospital of 100 Beds.) Applications are invited from registered medical practitioners for the position of MEDICAL SUPERINTENDENT at the above Hospital, situated in a large industrial area. Total attendances Casualty and Outpatient Departments—61,000 per year. Accommodation available at the Hospital for a single man. Salary in accordance with determination approved by the Hospitals Commission of N.S.W., at present, £A2014 p.a., less £188 a year for board and residence.

Applications endorsed "Medical Superintendent," stating age, qualifications, experience, nationality and marital status together with copies of 3 testimonials, to be forwarded to reach the undersigned not later than 1st October, 1957. The successful applicant will be required to commence duties during January, 1958.

R. T. WRIGHT, Secretary and Chief Executive Officer.



**NEW ZEALAND. THE OTAGO HOSPITAL BOARD,** DUNEDIN, NEW ZEALAND. Applications are invited from persons who have held a medical degree for at least 5 years, for the position of ASSISTANT RADIOTHERAPIST with the Otago Hospital Board.

The salary scale payable will be in accordance with the appointee's qualifications and experience and will be either :—

(*a*) Junior Specialist's scale : £1640–£1940 p.a., or

(*b*) Senior Specialist's scale : £2040–£2340 p.a.

The commencing rate within the applicable scale will be that determined by the Department of Health's Medical Officers' Salaries Grading Committee in accordance with the experience, qualifications and status of the appointee.

The position is non-resident, is full-time and private practice is not permitted. Conditions of appointment may be obtained on application to the High Commissioner for New Zealand, 415, Strand, London, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2, or the undersigned. Travelling expenses in accordance with those stated in the conditions of appointment are payable where the appointee signs an agreement to remain in the service of the Board for a period of 2 years.

Applications, stating age, qualifications and experience, together with testimonials and Health and Radiological Certificates are to be in the hands of the undersigned by 10 A.M. on Friday, 18th October, 1957.

W. A. WILLIAMSON, Secretary, Otago Hospital Board.
P.O. Box 946, Dunedin, New Zealand.

**U.S.A. VIRGINIA. Progressive State mental hospital** in Virginia, 4600 Beds, expanding staff, invites applications for PHYSICIANS at all levels, psychiatric experience desirable but not necessary. Salary from $8040 (approximately £2750). All modern methods of treatments. Opportunities for research. Good retirement plan.

Apply to JUUL C. NIELSEN, M.D., Superintendent, sending full résumé in first letter to Box 271, Petersburg, Virginia, U.S.A.

## Hospital Services : Junior Appointments

**BATTERSEA GENERAL HOSPITAL, Battersea Park,** S.W.11. HOUSE PHYSICIAN (House Officer grade), resident. Not pre-registration. Vacant late August.

Apply Hospital Secretary, enclosing copies of 2 recent testimonials.

**BETHNAL GREEN HOSPITAL, Cambridge Heath-road,** London, E.2. Applications are invited for the pre-registration post of HOUSE PHYSICIAN, vacant 14th August, 1957.

Applications, stating experience, together with copies of 2 recent testimonials, to Hospital Secretary as soon as possible.

**BROMPTON HOSPITAL, S.W.3. Applications invited** for the post of NON-RESIDENT HOUSE PHYSICIAN for which there are 3 vacancies, for 6 months from 1st October, 1957. Duties include work in Outpatient Department and wards. Salary at the rate of £577 10s. p.a.

Applications, stating age, qualifications with dates, nationality, and appointments held, together with copies of testimonials, by 10th August, 1957, to—

KENNETH A. F. MILES, House Governor.

**CENTRAL MIDDLESEX HOSPITAL, Park Royal, N.W.10.** NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR (whole-time) required in General Medical and Cardiological Department of above Hospital. Experience in chest and heart diseases desirable. Opportunity for research work. Resident when on duty. Appointment for 1 year, renewable. Hospital may be visited by direct appointment.

Application forms obtainable from, and returnable to, Secretary, Central Middlesex Group Hospital Management Committee, Park Royal, N.W.10, by 3rd August.

**CENTRAL MIDDLESEX HOSPITAL, Park Royal,** London, N.W.10. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time SURGICAL REGISTRAR required at above Hospital. Post now vacant. Appointment for 1 year in the first instance.

Application forms from, and returnable to, Group Secretary, Central Middlesex Group Hospital Management Committee, Park Royal, N.W.10, by 10th August, 1957.

**COLINDALE HOSPITAL, Colindale-avenue, London,** N.W.9. (300 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Whole-time SURGICAL REGISTRAR (resident or non-resident), required at above Hospital. Post vacant 1st September, 1957. F.R.C.S. and previous experience an advantage. Work covers surgical treatment of pulmonary, orthopædic, urinary and tuberculous and non-tuberculous chest diseases. The Hospital is situated within easy access to central London and may be visited by arrangement with Physician-Superintendent.

Application forms obtainable from, and returnable to, Group Secretary, Hendon Group Hospital Management Committee, Edgware General Hospital, Edgware, Middlesex, by 6th August, 1957.

**FULHAM HOSPITAL, St. Dunstan's-road, Hammersmith,** W.6. SURGICAL REGISTRAR. Post vacant 1st October, 1957. Candidates may visit Hospital by arrangement with the Hospital Secretary.

Applications (6 copies) to be submitted by 9th August, 1957, on forms obtainable from, and returnable to, Group Secretary (L.58), 5, Collingham-gardens, London, S.W.5.

**ELIZABETH GARRETT ANDERSON HOSPITAL,** Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from pre-registration and registered Women medical practitioners for the post of OBSTETRIC HOUSE SURGEON (recognised for the M.R.C.O.G.). Duties to commence 1st September, 1957. Appointment for 6 months. Salary in accordance with Ministry of Health scale for House Officers.

Applications, with copies of 3 recent testimonials, to be sent to the Secretary, Elizabeth Garrett Anderson Hospital, by 31st July, 1957.

**ELIZABETH GARRETT ANDERSON HOSPITAL,** Euston-road, N.W.1. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from registered Women medical practitioners for the post of Full-time REGISTRAR in Pathology (non-resident). Appointment for 1 year in the first instance to commence 1st October, 1957. Salary in accordance with Ministry of Health scale for Registrars.

Applications, with names of 3 referees, should be sent to the Secretary, Elizabeth Garrett Anderson Hospital, Euston-road, N.W.1, by 31st July.

**GERMAN HOSPITAL, London, E.8. (General—157 Beds.)** Applications for the 6-months resident appointment vacant 19th August of HOUSE SURGEON (obstetrics and gynæcology) (registered candidates only), should reach the Group Secretary, Hackney Hospital, London, E.9, by 6th August, quoting GH/HSO.

**GUY'S HOSPITAL, S.E.1. Applications are invited for** the post of SENIOR REGISTRAR in Psychological Medicine at Guy's Hospital for 1 year, with duties commencing 1st October, 1957.

Forms of application are obtainable from, and should be lodged with, the Superintendent, Guy's Hospital, London Bridge, S.E.1, not later than 2nd August, 1957.

**GUY'S HOSPITAL, S.E.1. Applications are invited for** the post of REGISTRAR in Orthopædics (mid-grade) at Guy's Hospital for 1 year, with duties commencing 1st October, 1957. Preference will be given to applicants holding the F.R.C.S.

Forms of application are obtainable from, and should be lodged with, the Superintendent, Guy's Hospital, London Bridge, S.E.1, not later than 2nd August, 1957.

**HAMMERSMITH HOSPITAL AND POSTGRADUATE** MEDICAL SCHOOL, Ducane-road, London, W.12. RESIDENT HOUSE PHYSICIAN (pædiatrics) required 1st October. Post recognised for D.C.H.

Applications, on forms obtainable from the Secretary, Board of Governors, The Hammersmith, West London and St. Mark's Hospitals, Ducane-road, London, W.12, to be returned by 12th August.

**HAMPSTEAD GENERAL HOSPITAL, Haverstock Hill,** N.W.3. (ROYAL FREE HOSPITAL GROUP.) Applications are invited from registered medical practitioners for the post of RESIDENT CASUALTY OFFICER (graded as Senior House Officer). Salary £819 10s. p.a. Vacant 1st September, 1957, tenable for a period of 6 months at the Main Outpatients Department, Bayham-street, N.W.1.

Application forms may be obtained from the Secretary, to whom they should be returned together with copies of 3 recent testimonials, by 31st July, 1957.

**HENDON ISOLATION HOSPITAL, Goldsmith-avenue,** Hendon, N.W.9. Locum MEDICAL REGISTRAR (resident) required for 3 weeks from 28th September, 1957, to 18th October, 1957, inclusive, at above Hospital.

Apply immediately to the Physician-in-charge, telephone COLindale 8182, from whom further particulars can be obtained.

**HENDON ISOLATION HOSPITAL, Goldsmith-avenue,** London, N.W.9. (92 infectious diseases beds and 20 gynæcological beds.) JUNIOR HOSPITAL MEDICAL OFFICER required at above Hospital. Previous similar experience essential. Post vacant 3rd September, 1957.

Apply, stating age, nationality, qualifications and details of experience, together with the names and addresses of 2 referees, to Group Secretary, Edgware General Hospital, Edgware, Middlesex, by 3rd August, 1957.

**HOSPITAL OF ST. JOHN AND ST. ELIZABETH,** 60, Grove End-road, London, N.W.8. Required to commence on Wednesday, 14th August, Full-time SURGICAL REGISTRAR (Male). The possession of the Diploma of Fellow of 1 of the Royal Colleges is desirable. Honorarium at the rate of £850 p.a. Appointment will be for a period of 12 months.

Further particulars may be obtained from the Secretary to whom applications, with names of 3 referees, should be sent on or before Wednesday, 31st July, 1957.

**KING EDWARD MEMORIAL HOSPITAL, Ealing.** SENIOR HOUSE OFFICER required 1st September, 1957, at King Edward Memorial Hospital for duty in Casualty and Fracture Departments. Recognised for 6 months casualty work for F.R.C.S. examination. Resident or non-resident.

Applications, giving age, nationality, qualifications and experience with dates, to Group Secretary, South West Middlesex Hospital Management Committee, West Middlesex Hospital, Isleworth, by 7th August.

**KING EDWARD MEMORIAL HOSPITAL, Ealing;** PERIVALE MATERNITY HOSPITAL, GREENFORD. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR (whole-time), Obstetrics and Gynæcology, for duty at King Edward Memorial Hospital, Ealing (17 gynæcological beds), Perivale Maternity Hospital, Greenford (50 obstetric beds). Recognised in Obstetrics by Royal College of Obstetricians and Gynæcologists for Membership. Resident at Perivale Maternity Hospital. Vacant 12th October. Candidates may visit hospitals by appointment with Hospital Secretary (Ealing 4081).

Application forms obtainable from, and returnable to, Group Secretary, South West Middlesex Hospital Management Committee, West Middlesex Hospital, Isleworth, by 6th August.

**LONDON CHEST HOSPITAL. Hospitals for Diseases** OF THE CHEST. 2 vacancies occur 1st October, 1957, for RESIDENT HOUSE PHYSICIAN. Appointments for 6 months, 4 in London, 2 at the Country Branch, near Letchworth, and posts graded as House Officer. Duties include work in the Outpatient Department and Special Clinics as well as in wards.

Applications, stating date of birth, qualifications with dates, and previous appointments held, with copies of 3 testimonials, should reach the undersigned not later than 17th August.

THOMAS BROWN, House Governor.

London Chest Hospital, E.2.

**LAMBETH HOSPITAL, Brook-drive, S.E.11.** Applications are invited from pre-registration and registered medical practitioners for the post of RESIDENT HOUSE SURGEON in the Obstetric and Gynæcological Unit. Appointment for 6 months from 1st September, 1957. Recognised for the M.R.C.O.G. and D.Obst.R.C.O.G.

Forms of application from the Acting Physician-Superintendent. Please include a stamped addressed envelope.

**MEMORIAL HOSPITAL, Shooters Hill, Woolwich, S.E.18.** SENIOR HOUSE OFFICER (Casualty Department), vacant 4th August. Recognised for F.R.C.S. 6 months resident appointment and may then be renewed. Salary £819 10s. p.a., less £150 p.a. for residence.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

**METROPOLITAN HOSPITAL, Kingsland-road, London,** E.8. REGISTRAR in General Surgery required for locum duties, for approximately 12 months. Resident or non-resident. Possession of F.R.C.S. desirable.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 testimonials, to the Hospital Secretary by 3rd August, 1957.

**METROPOLITAN EAR, NOSE AND THROAT HOS-**PITAL at St. Mary Abbots Hospital, Marloes-road, Kensington, W.8. HOUSE SURGEON (E.N.T.) required, vacant 6th September. Post recognised for D.L.O. Resident appointment for 6 months in first instance.

Applications by 9th August, 1957, on forms obtainable from the Hospital Secretary (L.60), St. Mary Abbots Hospital.

**MILDMAY MISSION HOSPITAL, Austin-street, London,** E.2. Applications are invited for the pre-registration post of RESIDENT HOUSE SURGEON (post recognised for F.R.C.S.), vacant on 31st July, 1957. Candidates should be in sympathy with the evangelical Christian aims of the Hospital.

Applications and references to be addressed to the Medical Superintendent as soon as possible.

**MILE END HOSPITAL, Bancroft-road, London, E.1.** (484 Beds.) HOUSE SURGEON (pre- or post-registration). Post vacant 25th August, 1957.

Application forms, obtainable from Physician-Superintendent, should be returned by 9th August with copies of not more than 3 testimonials.

**NATIONAL HOSPITALS FOR NERVOUS DISEASES.** Applications are invited from registered medical practitioners for the appointment of 2 HOUSE PHYSICIANS (non-resident), to commence the beginning of November on dates to be arranged. The appointments will be for periods of 6 months. These posts carry the grade of Senior House Officer.

Applications, with names of 3 referees, to be sent to the undersigned not later than 17th August, 1957.

H. EWART MITCHELL,
Secretary to the Board of Governors.

The National Hospitals for Nervous Diseases,
Queen-square, W.C.1.

**PRINCESS BEATRICE HOSPITAL, Earls Court, London,** S.W.5. Applications are invited from medical practitioners for the post of CASUALTY OFFICER (some anæsthetic duties). Senior House Officer grade recognised for F.R.C.S. Opportunity to serve for a further 6 months as House Physician in same grade.

Applications, with 3 testimonials, to the House Governor immediately.

**QUEEN CHARLOTTE'S AND CHELSEA HOSPITALS.** ANÆSTHETIST (Senior House Officer) resident post tenable for 6 months from 1st October, 1957, in the first instance, for duties at both hospitals. Post recognised for the purpose of the F.F.A.R.C.S.

Applications to the House Governor by 10th August on forms obtainable from 339, Goldhawk-road, London, W.6.

**QUEEN CHARLOTTE'S AND CHELSEA HOSPITALS.** QUEEN CHARLOTTE'S MATERNITY HOSPITAL. SENIOR HOUSE OFFICER in the Pædiatric Department. Resident post tenable for 6 months in the first instance from 1st October, 1957. Duties will include the supervision of the babies, research work under the visiting staff and charge of the follow-up clinics. Previous experience at a children's hospital is essential and possession of a higher qualification is desirable.

Applications to the House Governor by 10th August on forms obtainable from 339, Goldhawk-road, London, W.6.

**ROYAL NATIONAL THROAT, NOSE AND EAR HOS-**PITAL, AND INSTITUTE OF LARYNGOLOGY AND OTOLOGY, Gray's Inn-road, W.C.1, and Golden-square, W.1. Applications are invited for a post of SENIOR REGISTRAR from a date to be arranged. The appointment will be for an initial period of 1 year, subject to annual re-election thereafter up to the maximum permissible term in this grade and otherwise in accordance with the terms and conditions of service in the National Health Service. Applicants must have had considerable experience in general surgery and in this specialty and hold a higher surgical qualification.

Applications should give full information as to qualifications and experience, and the names of 2 referees, and should be sent in duplicate to the House Governor before 16th August.

**ROYAL NATIONAL THROAT, NOSE AND EAR HOS-**PITAL, Gray's Inn-road, W.C.1, and Golden-square, W.1, with which is associated the Institute of Laryngology and Otology (University of London). General Practitioner CLINICAL ASSISTANTS and OUTPATIENT ASSISTANTS. These appointments give those engaged in general practice who are able to attend for 2 sessions weekly over a period of 15 months commencing in October, 1957, the opportunity of widening their clinical experience in the specialty. At the end of 3 months training period the holders will be appointed as Outpatient Assistants with remuneration under paragraph 10 (*b*) of the National Health Service terms and conditions of service.

Further particulars may be obtained from the House Governor.

**ROYAL NATIONAL THROAT, NOSE AND EAR HOSPITAL**, Gray's Inn-road, W.C.1, and Golden-square, W.1. RESIDENT HOUSE SURGEON (post-registration post). Applications are invited for a 6 months appointment as from 1st September, 1957, with salary and conditions as laid down for House Officers in the terms and conditions of service in the National Health Service.

Applications, stating age, qualifications, full details of previous experience (particularly in this specialty), with copies of 1–3 recent testimonials, should be sent to the House Governor without delay.

**ROYAL EYE HOSPITAL. Applications are invited for** the post of RESIDENT SENIOR HOUSE OFFICER from 1st October, 1957. The Hospital is recognised for the F.R.C.S. and D.O.

Application forms from the Secretary, Royal Eye Hospital, St. George's-circus, S.E.1, not later than 9th August, 1957.

**ROYAL FREE HOSPITAL GROUP. Applications are** invited for the post of SENIOR RESIDENT ANÆSTHETIST. Applicants must be registered medical practitioners. The appointment is for 6 months from 1st October, 1957, with duties at the North Western Branch and Hampstead General Hospital. Salary in accordance with the scale laid down by the Ministry of Health for Senior House Officers.

Application forms may be obtained from the Hospital Secretary, Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned not later than 1st September, 1957.

**ROYAL FREE HOSPITAL GROUP. Applications are** invited from registered medical practitioners for the post of JUNIOR RESIDENT ANÆSTHETIST. The appointment is for 6 months, duties to commence 1st October, 1957. Salary and conditions of service in accordance with the Ministry of Health scale for House Officers.

Application forms may be obtained from the Hospital Secretary, Royal Free Hospital, Gray's Inn-road, W.C.1, to whom they should be returned not later than 1st September, 1957.

**ROYAL NORTHERN HOSPITAL. (279 Beds.) North** WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR required in the Orthopædic and Fracture Department of the above Hospital. The department has a very large fracture clinic. Candidates may visit Hospital by direct appointment.

Application forms obtainable from, and returnable to, the Secretary, Royal Northern Hospital, Holloway-road, London, N.7, by 7th August, 1957.

**ROYAL NORTHERN HOSPITAL, Holloway-road,** London, N.7. CLINICAL ASSISTANT (part-time) required for E.N.T. General Practitioner grade. Tuesdays P.M. Saturdays A.M. Tenable for 1 year.

Application forms from Hospital Secretary.

**SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.** Applications are invited for an appointment as Whole-time REGISTRAR in General Medicine to fill a vacancy in the approved establishment at the Bermondsey and Southwark Group of hospitals, for duties at New Cross General Hospital, Avonley-road, S.E.14. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications, and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 10th August, 1957.

**SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.** Applications are invited for an appointment as Whole-time REGISTRAR in Pathology to fill a vacancy in the approved trainee establishment at the Bermondsey and Southwark Group of hospitals, for duties at St. Olave's Hospital, Lower-road, S.E.16. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, London, W.1, not later than 10th August.

**SOUTH-EAST REGIONAL THORACIC SURGERY UNIT.** (50 Beds.) BROOK GENERAL HOSPITAL, Shooters Hill-road, S.E.18. SENIOR HOUSE OFFICER, vacant 1st August. Recognised for F.R.C.S. 6 months appointment and may then be renewed for a further period. The Unit treats all types of chest diseases and offers opportunity for comprehensive training in thoracic surgery.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

**SOUTH LONDON HOSPITAL FOR WOMEN AND CHILDREN**, Clapham Common, S.W.4. Applications are invited from registered Women practitioners for the post of Part-time NON-RESIDENT CASUALTY OFFICER (Senior House Officer grade) to attend every morning. The appointment is for a period of 6 months commencing 13th September, 1957.

Forms of application from the Secretary.

**ST. ANN'S GENERAL HOSPITAL, N.15. Applications** are invited for the appointment of RESIDENT HOUSE SURGEON (third post) to above Hospital for a period of 6 months. Vacant immediately.

Application form from Secretary, Tottenham Group Hospital Management Committee, The Green, N.15.

**ST. JOHN'S HOSPITAL, St. John's Hill, S.W.11. Senior** HOUSE OFFICER, vacant mid-September. Duties mainly in Geriatric Department, with some orthopædic work. Post offers excellent experience in these 2 fields. Particularly suitable for one working for higher qualifications.

Apply Medical Superintendent, with copies of 2 recent testimonials.

**ST. MARY'S HOSPITAL, Paddington, W.2. Applications** are invited for the post of NON-RESIDENT ORTHOPÆDIC REGISTRAR AND CASUALTY SURGICAL OFFICER graded Registrar, the F.R.C.S. qualification is desirable. The appointment is for a first period of 12 months, the holder normally being eligible for re-election. The successful candidate will be required to take up his duties as soon as possible and to work half-time in the Casualty Department and half-time on the Orthopædic Firm.

Applications, stating nationality, date of birth, permanent address, qualifications with dates, details and National Health Service gradings of previous and present appointments, together with the names and addresses of 3 referees, should reach ALAN POWDITCH, House Governor, not later than 7th August, 1957.

**ST. MARY'S HOSPITAL, W.2, AND THE NORTH** WEST METROPOLITAN REGIONAL HOSPITAL BOARD. Applications are invited for the post of SENIOR REGISTRAR in Psychiatry. The successful candidate will be required to undertake 7 sessions per week at St. Mary's Hospital and 4 sessions per week at St. Bernard's Hospital, Southall. Candidates are expected to have had the appropriate experience and to hold the D.P.M. and to take up the appointment as soon as possible.

Application forms, which may be obtained from ALAN POWDITCH, House Governor, must be returned not later than 7th August, 1957.

**ST. MARY'S HOSPITAL FOR WOMEN AND CHILDREN,** Upper-road, Plaistow, London, E.13. RESIDENT SENIOR HOUSE OFFICER (general medicine) required for a period of 12 months commencing 15th September, 1957.

Apply by 3rd August to Group Secretary, West Ham Group Hospital Management Committee, Stratford, London, E.15, naming 3 referees.

**ST. NICHOLAS HOSPITAL, Plumstead, S.E.18. Senior** HOUSE OFFICER (Casualty, Orthopædic and Fracture Departments), vacant 11th August. Recognised for F.R.C.S. 6 months resident appointment and may then be renewed. Salary £819 10s. p.a., less £150 p.a. for residence.

Apply to Group Secretary, Memorial Hospital, Woolwich, S.E.18.

**ST. PETER'S, ST. PAUL'S AND ST. PHILIP'S HOSPITALS.** RESIDENT SURGICAL OFFICER (Senior Registrar grade), required for St. Peter's Hospital on 1st October, 1957. Applications invited from Male candidates on the British register who have completed their training in general surgery. Appointment for 6 months, with opportunity for a further 6 months if recommended. Candidates should be prepared to spend 1 year at the Hospital if required.

Applications (12 copies), and the names of 3 referees, should reach the House Governor, St. Peter's Hospital, Henrietta-street, W.C.2, by 7th September, 1957.

**WESTMINSTER HOSPITAL, St. John's Gardens, S.W.1.** Applications invited for post of SENIOR HOUSE OFFICER to E.N.T. Department for 1 year from 18th October, 1957.

Applications (5 copies), with names of 2 referees, to House Governor by 10th August.

**WHIPPS CROSS HOSPITAL, London, E.11. Applications** are invited for the following posts :—

HOUSE PHYSICIAN (post- or pre-registration), general medicine, vacant 21st September, 1957.

HOUSE PHYSICIAN (pre-registration), general medicine, vacant 25th September, 1957.

Application forms (please state which post applied for) from the Hospital Secretary, to be returned by 6th August, 1957.

**ABERDEEN GENERAL HOSPITALS BOARD OF MANAGEMENT. ABERDEEN ROYAL INFIRMARY.** Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER in the Casualty Department of the Aberdeen Royal Infirmary. The post, which becomes vacant on 30th September, is a non-resident one. Salary and conditions of service in accordance with the terms issued by the Department of Health for Scotland.

Applications, giving details of qualifications and experience, with the names of 2 referees, should be lodged with the Secretary, Aberdeen General Hospitals, P.O. Box No. 92, 62, Queen's-road, Aberdeen, within 14 days of the appearance of this advertisement.

**ABERDEEN SPECIAL HOSPITALS BOARD OF MANAGEMENT.** Applications are invited for the post of SENIOR HOUSE OFFICER. The duties include work at the Royal Aberdeen Hospital for Sick Children and Aberdeen Maternity Hospital. The appointment is tenable for 12 months.

Applications, giving full details of age, qualifications and experience, together with the names of 2 referees, should be sent to the Group Medical Superintendent, Royal Aberdeen Hospital for Sick Children, Westburn-drive, Aberdeen, as soon as possible.

**ABERGAVENNY. NEVILL HALL HOSPITAL. North** MONMOUTHSHIRE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT SENIOR HOUSE PHYSICIAN at the above Hospital, which is the Group Medical Unit with full diagnostic facilities. Resident Registrar.

Apply immediately, giving details of medical career, names of 2 referees, and stating earliest date available for duty. Applications to Group Secretary, North Monmouthshire Hospital Management Committee, Nevill Hall Hospital, Abergavenny, Mon.

**ASHFORD HOSPITAL, Ashford, Middlesex. (560 Beds.)** STAINES GROUP HOSPITAL MANAGEMENT COMMITTEE. Required, RESIDENT HOUSE SURGEON for Traumatic and Orthopædic Unit. 6 months appointment, suitable for pre-registration candidate.

Applications, stating age, qualifications and experience with copies of up to 3 recent testimonials, to Medical Director of Hospital immediately.

**AYLESBURY, BUCKINGHAMSHIRE. ROYAL BUCKINGHAMSHIRE HOSPITAL.** OPHTHALMIC HOUSE OFFICER required immediately. Post recognised for D.O.

Apply, with 2 names for reference, to Secretary Superintendent.

**ACCRINGTON. VICTORIA HOSPITAL.** (114 Beds.) BLACKBURN AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. HOUSE SURGEON required for 6th September, 1957. Post recognised for F.R.C.S. and approved for pre-registration purposes.

Applications to Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn.

**ALTRINCHAM GENERAL HOSPITAL. Assistant** SENIOR SURGICAL OFFICER (Junior Hospital Medical Officer grade). Applications are invited for this post in a hospital of 130 acute beds with a busy Casualty Department. The appointee would be required to exercise control of this Department and also to assist Resident Surgical Officer with the general surgical work of the Hospital. The post offers excellent opportunities of practical experience and postgraduate study to suitably qualified candidates and particularly those studying for higher surgical qualifications.

Applications, with names of 2 referees, to Group Secretary, North and Mid-Cheshire Hospital Management Committee, Sinderland-road, Altrincham.

**BARNSLEY. BECKETT HOSPITAL.** (202 Beds.) RESIDENT HOUSE SURGEON and HOUSE SURGEON (orthopædics and casualty), Male or Female, required immediately. Posts are approved for pre-registration purposes.

Applications should be forwarded to the Secretary, Barnsley Hospital Management Committee, 33, Gawber-road, Barnsley.

**BARNSTAPLE. NORTH DEVON INFIRMARY.** (105 Beds.) HOUSE SURGEON (pre-registration) required. Post vacant 4th September, 1957.

Applications to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

**BARNSTAPLE. NORTH DEVON INFIRMARY.** (105 Beds.) SENIOR HOUSE OFFICER required, whose duties will be mainly casualty. Post tenable for 1 year. Small furnished flat available.

Applications to Group Secretary, North Devon Hospital Management Committee, 19, Alexandra-road, Barnstaple.

**BARROW-IN-FURNESS. RISEDALE MATERNITY** HOSPITAL. BARROW AND FURNESS HOSPITAL MANAGEMENT COMMITTEE. OBSTETRIC AND GYNÆCOLOGY DEPARTMENT. Applications are invited for the resident post of SENIOR HOUSE OFFICER at the above Hospital. Post available middle September, 1957. Hospital approved for D.Obst.R.C.O.G.

Applications to the Group Secretary, 105, Abbey-road, Barrow-in-Furness.

**BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL.** (229 acute beds.) HOUSE SURGEON (first, second or third post), vacant soon. General surgical duties, some orthopædics. Offering good opportunities for general experience in busy acute general hospital. Recognised for F.R.C.S. Approved pre-registration post. Married quarters may be available.

Applications to Group Secretary.

**BEVERLEY, YORKSHIRE. WESTWOOD HOSPITAL.** (229 acute beds.) ORTHOPÆDIC HOUSE SURGEON (first, second or third post), vacant now. Offers good opportunity for general experience in busy acute general hospital. Approved pre-registration post. Fully qualified practitioners may apply. Recognised for F.R.C.S.

Apply Group Secretary.

**BISHOP AUCKLAND, co. DURHAM. THE GENERAL** HOSPITAL. (350 Beds.) HOUSE SURGEON required. Recognised pre-registration appointment.

Apply, naming 2 referees, to K. G. T. LUXFORD, Group Secretary, South West Durham Hospital Management Committee, at the above address.

**BIRMINGHAM (near). THE MIDLAND CENTRE FOR** NEUROSURGERY. Holly-lane, SMETHWICK, near BIRMINGHAM. (75 Beds.) SENIOR HOUSE OFFICER. Duties to commence on or about 1st September, 1957. The appointment is for 6 or 12 months and is tenable in medical neurology and neurosurgery.

Applications, with names of 2 referees, to the Group Secretary, West Bromwich and District Hospitals Management Committee.

**BIRMINGHAM (near). MARSTON GREEN MATER-**NITY HOSPITAL, Berwicks-lane, MARSTON GREEN, near BIRMINGHAM. RESIDENT SENIOR HOUSE OFFICER in Pædiatrics required 1st October, 1957, for 6 months or 1 year (the latter to be recognised for D.C.H.). Duties in Premature Baby Unit (12 Cots); in Neo-natal Department at above Hospital (121 Beds) (Hospital affiliated to the University of Birmingham for the teaching of students); and in Neo-natal and Children's Departments at neighbouring hospitals. Previous pædiatric or obstetric experience desirable.

Detailed applications to Group Secretary, Dudley Road Hospital, Birmingham, 18.

**BIRMINGHAM. THE UNITED BIRMINGHAM HOS-**PITALS. GENERAL HOSPITAL. Applications are invited for the post of MEDICAL REGISTRAR (Registrar grade). The post is tenable for 1 year in the first instance. Candidates should have the M.R.C.P. (London). The successful candidate may be required to be resident.

Forms of application may be obtained from, and should be returned not later than 10th August, 1957, to, the Secretary, The United Birmingham Hospitals, Queen Elizabeth Hospital, Birmingham, 15.

**BIRMINGHAM REGIONAL HOSPITAL BOARD.** Whole-time SENIOR REGISTRAR in Obstetrics and Gynæcology. Duties mainly at Women's Hospital, Wolverhampton (91 obstetric and gynæcological beds). Resident. Married quarters available. M.R.C.O.G. essential. Successful candidate may subsequently be required to spend not more than 2 years in a selected hospital of the United Birmingham Hospitals under the scheme for the interchange of Senior Registrars between the 2 Boards.

Application forms from Secretary, Regional Hospital Board, 10, Augustus-road, Birmingham, 15, to be returned by 12th August, 1957. Candidates may visit Hospital.

**BIRMINGHAM REGIONAL HOSPITAL BOARD.**

(1) **Birmingham (Selly Oak) Group, Oak Tree-lane, Birmingham, 29**

SURGICAL REGISTRAR for Birmingham Accident Hospital (215 Beds). Special experience available in treatment of shock, infection and principles of plastic surgery in connection with M.R.C. Burns Unit. Previous experience not essential. F.R.C.S. advantageous.

(2) **South Worcestershire Group, Worcester Royal Infirmary**

REGISTRAR (obstetrics and gynæcology) for Worcester Royal Infirmary and Ronkswood Hospital. Whole-time, resident. Duties mainly at Ronkswood Hospital. 50 obstetric and 36 gynæcological beds. Single and married quarters available. Post recognised for M.R.C.O.G. and D.Obst.R.C.O.G. Vacant 1st October, 1957.

(3) **Shrewsbury Group, Royal Salop Infirmary, Shrewsbury**

REGISTRAR (radiology) (radiodiagnosis) for Shrewsbury Group and Robert Jones and Agnes Hunt Orthopædic Hospital, Oswestry. Resident or non-resident.

Application forms from Group Secretaries to be returned by 8th August, 1957.

**BIRMINGHAM. THE SKIN HOSPITAL, INPATIENTS'** DEPARTMENT, George-road, BIRMINGHAM, 15. SENIOR HOUSE OFFICER or HOUSE OFFICER (resident) required. Modern well-equipped Inpatients' Department, providing facilities for study of skin diseases. Required to assist Consultant at out-patients clinics.

Applications, with copies of 2 recent testimonials, to Group Secretary, Dudley Road Hospital, Birmingham, 18.

**BOLTON. THE ROYAL INFIRMARY.** (237 Beds.) RESIDENT SENIOR HOUSE OFFICER in Medicine. Vacant early September and tenable for 12 months.

Applications, stating age, nationality, qualifications, experience and the names of 2 referees, to Group Secretary, Bolton and District Hospital Management Committee, The Royal Infirmary, Bolton.

**BRECHIN, ANGUS. STRACATHRO HOSPITAL.** (676 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER to the Orthopædic Unit (178 Beds). The successful candidate will carry out his duties under the Consultants and Senior Registrar and will be assisted by pre-registration House Officers. Salary £819 10s. p.a.

Applications, giving age, qualifications and experience and naming 2 referees, should be addressed to the Group Medical Superintendent at the Hospital.

**BRIGHTON GENERAL HOSPITAL. Applications are** invited for the appointment of HOUSE SURGEON to the Orthopædic Unit. Salary in accordance with national scale. This post is recognised as a pre-registration appointment.

Applications, stating age, qualifications, and experience, and naming 2 referees, to the Physician-Superintendent, Brighton General Hospital, Elm-grove, Brighton.

**BRISTOL. COSSHAM AND FRENCHAY HOSPITAL** MANAGEMENT COMMITTEE. SENIOR HOUSE OFFICER required for the Department of Thoracic Surgery (120 Beds) at Frenchay Hospital.

Apply to Group Secretary, Frenchay Hospital, Bristol, giving age and experience and quoting 2 referees.

**BROXBURN, WEST LOTHIAN. BANGOUR GENERAL** HOSPITAL. (15 miles from Edinburgh.) Applications are invited for the post of RESIDENT CASUALTY OFFICER (Senior House Officer grade). Salary £819 10s. p.a., less £150 p.a. residential emoluments.

Applications, stating age, qualifications and particulars of previous experience, to the Group Secretary and Treasurer, Board of Management, Bangour Hospital, Broxburn, West Lothian.

**BURTON-ON-TRENT (near). BRETBY HALL ORTHO-**PÆDIC HOSPITAL. (78 available orthopædic beds.) SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (orthopædics) required for inpatient and operative work with children and adults. Hospital quarters available. Duties include certain outpatient responsibilities at Derbyshire Royal Infirmary. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 8th August, 1957, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

**BURY AND ROSSENDALE HOSPITAL MANAGEMENT** COMMITTEE. BURY GENERAL HOSPITAL. ROSSENDALE GENERAL HOSPITAL. Applications are invited for the posts of HOUSE OFFICER in Surgery at the above Hospitals. The posts are vacant now.

Apply, stating full details and names of 2 referees, to—
H. WILKINSON, Group Secretary.
Bury General Hospital, Bury, Lancs.

**BURY AND ROSSENDALE HOSPITAL MANAGEMENT** COMMITTEE. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER in Anæsthetics, to the above Group of hospitals. The post, which will become vacant on 1st October, 1957, is based at Bury General Hospital, and is recognised for the D.A. examination.

Apply, stating full details, and names of 2 referees, to—
H. WILKINSON, Esq., Group Secretary.
Bury General Hospital, Walmersley-road, Bury, Lancs.

**BOURNEMOUTH. ST. ANN'S HOSPITAL, Canford** CLIFFS, BOURNEMOUTH. (NEUROSIS HOSPITAL.) GROUP 52 HOSPITAL MANAGEMENT COMMITTEE. JUNIOR HOSPITAL MEDICAL OFFICER (whole-time) required. St. Ann's is a 68-Bed hospital for treatment of psychiatric patients without legal formalities. The appointment will be for 3 years in the first instance. The Hospital may be inspected by local arrangement.

Forms of application can be obtained from the Group Secretary, Holloway Sanatorium, Virginia Water, Surrey.

**BOURNEMOUTH (near). CHRISTCHURCH HOSPITAL,** CHRISTCHURCH, HANTS. BOURNEMOUTH AND EAST DORSET HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of a RESIDENT SENIOR HOUSE OFFICER (surgical) for the above Hospital of 334 Beds, including a new Surgical Unit of 56 Beds. The post becomes vacant on 1st September, 1957. There is no emergency surgery undertaken at the moment, but the successful applicant will attend surgical outpatient sessions at the Royal Victoria Hospital, Boscombe.

Applications to the Hospital Secretary, Christchurch, Hospital.

**CANTERBURY. KENT AND CANTERBURY HOSPITAL.** (277 Beds.) The post of OBSTETRIC HOUSE SURGEON, which is recognised for the M.R.C.O.G. and D.Obst. R.C.O.G., becomes vacant in the middle of August, 1957. National Health Service salary and conditions.

Applications, together with 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

**CANTERBURY. KENT AND CANTERBURY HOSPITAL.** (277 Beds.) The post of GENERAL SURGICAL AND UROLOGICAL HOUSE SURGEON (pre-registration or third post), which is recognised for the F.R.C.S., becomes vacant in the middle of August, 1957, National Health Service salary and conditions.

Applications, together with copies of 2 recent testimonials, to be addressed to the Hospital Secretary at the above Hospital.

**CARDIFF. ST. DAVID'S HOSPITAL. Senior House** OFFICER (may be Locum) required for Accident Unit at above Hospital.

Form of application from Group Secretary, Cardiff Hospital Management Committee, 44, Cathedral-road, Cardiff.

**CARLUKE, LANARKSHIRE. LAW HOSPITAL. Applications** are invited for the following resident posts (pre- or post-registration) for the 6 months commencing 1st August, 1957.

HOUSE OFFICER (orthopædic).
HOUSE OFFICER (surgical).
HOUSE OFFICER (medical).

Applications, stating age, qualifications and previous experience, together with the names of 2 referees, should be submitted to the Group Medical Superintendent, Law Hospital, Carluke.

**CARLUKE, LANARKSHIRE. LAW HOSPITAL. Applications** are invited for the post of SENIOR HOUSE OFFICER (anæsthetics).

Applications, stating age, qualifications and previous experience, together with the names of 2 referees, should be submitted to the Group Medical Superintendent, Law Hospital, Carluke.

**CARMARTHEN. WEST WALES GENERAL HOSPITAL.** (188 Beds.) WEST WALES HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of RESIDENT HOUSE OFFICER (obstetrics and gynæcology), which is now vacant. Salary and conditions of service as laid down by the Ministry of Health.

Applications, stating age, qualifications, experience, nationality, with names and addresses of 3 referees, to the Group Secretary, West Wales Hospital Management Committee, Glangwili, Carmarthen.

**CARSHALTON, SURREY. QUEEN MARY'S HOSPITAL FOR CHILDREN.** (General Children's Hospital of 700 Beds.) Whole-time ANÆSTHETIC REGISTRAR. The surgery practice of the Hospital includes emergency, orthopædic, E.N.T., and general surgery, and there is a special Surgical Unit in association with the Hospital for Sick Children, Great Ormond-street. The post is recognised by the Faculty of Anæsthetists. Applicants are invited to visit the Hospital by appointment with the Physician-Superintendent.

Applications, on forms obtainable from the Group Secretary, should be submitted by 17th August, 1957.

**CHELMSFORD, ESSEX. BROOMFIELD HOSPITAL.** Required, experienced Locum Tenens SENIOR REGISTRAR for 1 year, full residence or only when on duty. Unit has 312 Beds for the treatment of pu onary tuberculosis in adults. Tuberculous and non-tuberculous thoracic surgery, chest clinics, and mass radiography.

Apply Physician-Superintendent.

**CHELMSFORD AND ESSEX HOSPITAL. Locum Tenens** REGISTRAR in Surgery required to work at the above Hospital for period 17th–31st August. Preference will be given to applicants holding F.R.C.S.

Applications to the Secretary, Chelmsford Hospital Management Committee, London-road, Chelmsford.

**CHERTSEY, SURREY. ST. PETER'S HOSPITAL (late** Botley's Park War Hospital). (430 Beds.) RESIDENT HOUSE SURGEON (Senior House Officer or Intern) required for Gynæcological (30 Beds) and E.N.T. (approximately 14 Beds) Departments. Salary in accordance with terms and conditions of National Health Service. Post vacant 15th August.

Applications, together with names and addresses of referees, to be sent to the Physician-Superintendent, St. Peter's Hospital, as soon as possible.

**COLCHESTER GROUP HOSPITAL MANAGEMENT** COMMITTEE. Applications are invited for :—

**Essex County Hospital, Colchester, Essex** (185 Beds)

Post of HOUSE OFFICER (surgical). First, second, third or pre-registration post, tenable for 6 months. Recognised for F.R.C.S.

**Black Notley Hospital, Braintree, Essex** (516 Beds)

Post of HOUSE SURGEON (first, second, third or pre-registration post). Includes duties in general surgical and gynæcological wards. Recognised for F.R.C.S.

Post of HOUSE PHYSICIAN (first, second, third or pre-registration post). Includes duties in medical and pædiatric wards.

Applications, with copies of 3 testimonials, to Group Secretary, Colchester Hospital Management Committee, 14, Pope's-lane, Colchester, Essex.

**CHESTERFIELD ROYAL HOSPITAL. House Officer or** SENIOR HOUSE OFFICER required 17th August, 1957, for Casualty Department. Post recognised for the F.R.C.S. and Pre-registration Service.

Please apply, with copies of 2 testimonials, to—
M. H. BOONE, Group Secretary.

**CHICHESTER. ROYAL WEST SUSSEX HOSPITAL.** (202 acute beds.) SENIOR HOUSE SURGEON (Deputy Resident Surgical Officer) required at above Hospital. Post recognised for F.R.C.S. Resident staff of 6—Resident Surgical Officer, 3 House Surgeons, Resident Medical Officer, and House Physician. Salary £819 10s. p.a., less residential charge. Vacant 18th August, 1957.

Applications, stating age, experience, qualifications with references, or names of referees, to Senior Administrative Officer.

**CREWE AND DISTRICT MEMORIAL HOSPITAL.** (108 Beds Acute, and continuation 32 Beds.) 2 Pre-registration HOUSE OFFICERS (surgical) required. Approved for F.R.C.S. Salary and conditions in accordance with Whitley Council scale. The appointments may be followed by second posts.

Apply immediately, stating age, qualifications, &c., with names of 2 referees, to the Group Secretary, South Cheshire Hospital Management Committee, Barony Hospital, Nantwich, Cheshire.

**CREWE AND DISTRICT MEMORIAL HOSPITAL.** REGISTRAR (Orthopædic Department) required. Modern Theatres and Accident Department, incorporating every facility. Full traumatic and orthopædic service being developed. Vacant 1st August, 1957. Salary and conditions as per regulations.

Applications, stating age, qualifications and experience, together with names of 3 referees, to Group Secretary, South Cheshire Hospital Management Committee, Barony Hospital, Nantwich.

**CREWE AND DISTRICT MEMORIAL HOSPITAL.** (108 Beds Acute, and Continuation 32 Beds.) SENIOR HOUSE OFFICER (casualty). Modern well-equipped department. Whitley Council salary scale and conditions of service.

Applications, stating age, qualifications, &c., with names of 2 referees, to be sent as soon as possible to the Group Secretary, South Cheshire Hospital Management Committee, Barony Hospital, Nantwich, Cheshire.

**CUCKFIELD HOSPITAL, Cuckfield, Haywards Heath,** SUSSEX. JUNIOR HOUSE SURGEON (general surgery). Pre-registration post now vacant. Health Service conditions.

Applications, stating age, nationality, qualifications and experience, with names of 2 referees, to Group Secretary, Mid-Sussex Hospital Management Committee.

**DARTFORD. THE BOW ARROW HOSPITAL. Senior** HOUSE OFFICER (resident) required at above Hospital. The Hospital contains 117 Beds (including children's ward of 28 Beds) for the treatment of pulmonary tuberculosis and other chest diseases.

Applications should be sent to the Group Secretary, Dartford Hospital Management Committee, The Bow Arrow Hospital, Dartford, Kent.

**DERBY. DERBYSHIRE ROYAL INFIRMARY (416 Beds),** DERBY CITY HOSPITAL (260 Beds). (Posts recognised for training for D.A. and F.F.A.R.C.S.) SHEFFIELD REGIONAL HOSPITAL BOARD. 2 Whole-time RESIDENT REGISTRARS (anæsthetics) required for the above hospitals. Duties also at other hospitals in the Group. These posts offer special experience in neuro and orthopædic surgery and obstetrics. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 8th August, 1957, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

**DEWSBURY, YORKSHIRE. STAINCLIFFE GENERAL** HOSPITAL. (311 Beds.) Applications are invited for the post of RESIDENT MEDICAL OFFICER (Junior Hospital Medical Officer grade) which becomes vacant on 1st October, 1957. The appointment is tenable for 1 year in the first instance. The Hospital has an acute adult Medical Unit of 70 Beds and also a Pædiatric Unit of 30 Beds.

Applications, giving full particulars and the names of 3 referees, should be sent to the Administrative Officer at the Hospital as soon as possible.

**DONCASTER ROYAL INFIRMARY. (330 Beds.) Applica**tions are invited for the post of HOUSE SURGEON (Interne or Senior House Officer). Post recognised for F.R.C.S.

Applications to the Group Secretary, Doncaster Hospital Management Committee, at Doncaster Royal Infirmary.

**DORKING GENERAL HOSPITAL, Hurst-road, Dorking,** SURREY. Applications are invited for the post of SENIOR HOUSE OFFICER (general surgery, casualty, orthopædics and E.N.T.), vacant on 1st September, 1957. Recognised for the F.R.C.S. Married quarters may be available to suitable applicant.

Apply, with testimonials, to the Medical Superintendent, Dorking General Hospital.

**DRIFFIELD, YORKSHIRE. EAST RIDING GENERAL** HOSPITAL. (247 Beds.) HOUSE PHYSICIAN (approved pre-registration post). Fully qualified practitioners may apply. Duties include acute and chronic medicine. Good general experience for first house appointment.

Apply Group Secretary, Westwood Hospital, Beverley, Yorkshire.

**DUDLEY, STOURBRIDGE AND DISTRICT HOSPITAL** GROUP, BIRMINGHAM REGION.

**The Guest Hospital, Dudley** (154 Beds)
SENIOR HOUSE OFFICER (casualty). Post now vacant.

**Wordsley Hospital, near Stourbridge** (478 Beds)
HOUSE OFFICER (surgical), pre-registration. Post now vacant.

Apply, Group Secretary, Guest Hospital, Dudley.

**DURHAM. UNIVERSITY OF DURHAM AND SHEFFIELD REGIONAL HOSPITAL BOARD.** Joint training scheme for Registrars in Psychological Medicine. 3 REGISTRARS in Psychiatry required. The Registrars will be allotted to each of the following hospitals. The Towers, Leicester; Carlton Hayes, Leicester; and Rauceby, Sleaford, Lincs. Appointees to commence in September, 1957. These posts form a part of the Joint Training Scheme in Psychiatry sponsored by the Newcastle and Sheffield Regional Hospital Boards in conjunction with Durham University. The tenure will be subject to annual review and the duties will be changed periodically in order to provide varied experience including mental deficiency. The normal period of training will be 2–3 years according to the previous experience of the trainee. The regulations for the D.P.M. (Durham) require no special course of study for Part I of the examination. In order to take Part II the candidate will be given 6 months study leave with pay to attend a full-time course of instruction at Newcastle under the ægis of the Professorial Department of Psychological Medicine. Full particulars of the Scheme may be obtained from the Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield.

Applications should be made to the Secretary of the Board by 12th August, 1957, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

**EAST ANGLIAN REGIONAL HOSPITAL BOARD.** REGISTRAR in Obstetrics and Gynæcology, Peterborough Group of hospitals. Unit consists of 73 obstetric beds and a busy Gynæcological Department. Recognised for M.R.C.O.G. in Obstetrics. Appointment for 1 year renewable for second year.

Applications, stating age, experience and the names of 3 referees, to Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 8th August, 1957. Candidates invited to visit hospitals by direct arrangement with Hospital Management Committee Secretary, Memorial Hospital, Peterborough.

**EAST KILBRIDE. HAIRMYRES HOSPITAL. (760 Beds.)** Applications are requested for the post of SENIOR HOUSE OFFICER in Anæsthetics, to take up duty on 1st September. Residence at Hairmyres Hospital. Duties will include anæsthetic sessions on 2 days a week at the Victoria Infirmary Glasgow.

Applications to the Physician-Superintendent, Hairmyres Hospital.

**EBBW VALE GENERAL HOSPITAL. (General Beds 71—Maternity 15.)** Applications are invited for the appointment of a SENIOR HOUSE OFFICER. The Hospital is an active Surgical Unit and the Medical staff consists of a Resident Surgeon and Junior Hospital Medical Officer and visiting Orthopædic, Gynæcological and Ophthalmic Surgeons. The tenure of appointment shall be for a period of 12 months.

Apply, giving full details and references, to Group Secretary, North Monmouthshire Hospital Management Committee, Nevill Hall, Abergavenny, Mon.

**EDGWARE GENERAL HOSPITAL AND BUSHEY MATERNITY HOSPITAL. NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD.** Whole-time RESIDENT OBSTETRIC REGISTRAR required at above Hospitals. Duties will include antenatal clinics at the Boreham Wood Health Centre. Possession of M.R.C.O.G. desirable but not essential. Post vacant early August, 1957. The successful candidate will be required to be in residence at Bushey Maternity Hospital, Bushey Heath, Herts (4½ miles from Edgware), where married quarters are available if required. Hospitals may be visited by direct appointment with Medical Director, Edgware General Hospital.

Application forms obtainable from, and returnable to, Group Secretary, Hendon Group Hospital Management Committee, Edgware General Hospital, Edgware, Middlesex, by 6th August, 1957.

**EDGWARE GENERAL HOSPITAL. (702 Beds.) Junior** HOSPITAL MEDICAL OFFICER (non-resident) required in the Casualty Department at above Hospital. Post vacant 5th September, 1957.

Apply, stating age, nationality, qualifications and giving details of experience together with the names and addresses of 2 referees, to Group Secretary, Hendon Group Hospital Management Committee, Edgware General Hospital, Edgware, Middlesex, by 10th August, 1957.

**EDINBURGH CENTRAL HOSPITALS BOARD OF MANAGEMENT.** Applications are invited from registered medical practitioners and pre-registration graduates, for a resident appointment as HOUSE SURGEON (E.N.T.) at the Royal Hospital for Sick Children, Edinburgh, for 6 months, commencing 1st October, 1957. National Health Service scale.

Applications, stating age, qualifications and experience, and names of 2 referees, to be sent to the Secretary, Edinburgh Central Hospitals Board, 1, Rillbank-terrace, Edinburgh, 9.

**FAREHAM, HAMPSHIRE. KNOWLE HOSPITAL. KNOWLE GROUP HOSPITAL MANAGEMENT COMMITTEE** invite applications for the post of JUNIOR HOSPITAL MEDICAL OFFICER to the above Hospital (mental). All forms of modern treatment are undertaken and previous psychiatric experience is not essential. There is a house available at a reasonable rental for a married officer. Terms and conditions of service will be as approved for hospital medical staff employed in the National Health Service. Salary £852 10s.–£55–£1182 10s. p.a.

Applications should be sent to the Physician-Superintendent, Knowle Hospital, Fareham, Hants.

**FARNBOROUGH HOSPITAL, Kent. (800 Beds.) Senior** HOUSE OFFICER in Anæsthetics (resident) required for 1 year from 14th September. Recognised for D.A. and F.F.A.R.C.S.

Apply, giving details of age, qualifications with dates, and experience, and naming 3 referees, to Administrative Officer.

**GLASGOW, S.2. VICTORIA INFIRMARY. Vacancies** exist from 1st August for pre- or post-registration posts—HOUSE SURGEONS in Orthopædic and E.N.T. Departments.

Apply Medical Superintendent.

**GREENFORD. PERIVALE MATERNITY HOSPITAL.** HOUSE OFFICER, vacant 14th August. Post recognised for Membership and Diploma in Obstetrics. Preference given to person seeking second pre-registration post under the Medical Act, 1950.

Applications, stating age, nationality, qualifications with dates and experience, to Group Secretary, South West Middlesex Hospital Management Committee, West Middlesex Hospital, Isleworth, Middlesex, by 2nd August.

**GRIMSBY GENERAL HOSPITAL. Grimsby Hospital MANAGEMENT COMMITTEE.** Applications are invited for the post of SENIOR HOUSE OFFICER (orthopædic). Orthopædic Unit of 71 Beds. Resident establishment—Registrar and 2 House Officers. Up-to-date Medical Library and reading facilities available.

Applications, with names of 2 referees, to Hospital Secretary.

**GUILDFORD. ROYAL SURREY COUNTY HOSPITAL. (232 Beds.)** SENIOR HOUSE OFFICER required 1st September for E.N.T. Department. Post recognised for D.L.O. and F.R.C.S. examinations.

Applications, with copies of 3 testimonials, should be sent to the Hospital Secretary as soon as possible.

**HASTINGS AND ST. LEONARDS-ON-SEA. BUCHANAN HOSPITAL (94 Beds.)** Locum SENIOR HOUSE OFFICER (urology) required 2nd August, 1957, for approximately 1 months appointment. Salary £15 19s. a week, less board.

Applications, for whole or part of the period, should give names of 2 referees and should be addressed to the Hospital Administrator.

**HASTINGS AND ST. LEONARDS-ON-SEA. BUCHANAN HOSPITAL. (94 Beds.)** HOUSE SURGEON required for 28 gynæcological beds in Hospital in course of being changed into unit for obstetric and gynæcological patients only. Post is vacant 8th September and recognised for M.R.C.O.G. Candidates for Pre-registration Service (surgery) can be considered.

Apply, giving names and addresses of 3 referees, to Hospital Administrator.

**HASTINGS. ST. HELEN'S HOSPITAL. (493 Beds.)** SENIOR HOUSE OFFICER (combined post pædiatrics and general medicine) required. Post vacant 25th August, 1957.

Apply to Hospital Administrator by first post 1st August, 1957.

**HEMEL HEMPSTEAD, HERTFORDSHIRE. WEST HERTS HOSPITAL.** Locum Tenens SENIOR HOUSE OFFICER (pædiatrics) required for period 16th–28th August (inclusive).

Applications, together with copies of 2 recent testimonials, should be sent to the Hospital Secretary as soon as possible.

**HEREFORD. COUNTY HOSPITAL. Senior House** OFFICER (pædiatrics) required for Unit of 60 Beds.

Applications in writing, together with names of 2 referees, to Group Secretary, Victoria House, Eign-street, Hereford.

**HILLINGDON HOSPITAL, Uxbridge, Middlesex. (621 Beds.)** 2 HOUSE SURGEONS. Combined posts in obstetrics and gynæcology, recognised for D.Obst.R.C.O.G. and M.R.C.O.G. Posts vacant middle August.

Apply, enclosing copies of 3 recent testimonials, to Medical Director by 6th August.

**HITCHIN, HERTFORDSHIRE. LISTER HOSPITAL.** RESIDENT CASUALTY OFFICER, for duty with Accident Service and care of traumatic and orthopædic inpatients, required 10th August, 1957. The post is recognised for F.R.C.S. Salary £852 10s.–£1182 10s. p.a., according to experience.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent to Medical Administrator at the above Hospital by 1st August, 1957.

**HUDDERSFIELD. MILL HILL HOSPITAL. (132 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE.** Applications are invited for the post of RESIDENT MEDICAL OFFICER (Junior Hospital Medical Officer grade—£852 10s.–£55–£1182 10s. p.a.) at the above Hospital. The present allocation of beds is 28 for infectious diseases and 104 for geriatric patients.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Group Secretary,
Huddersfield Hospital Management Committee.
The Royal Infirmary, Huddersfield.

**HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE.** 2 HOUSE SURGEONS required to commence duty immediately. The posts are recognised as pre-registration appointments and for the F.R.C.S. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Secretary to the Management Committee.
The Royal Infirmary, Huddersfield.

**HUDDERSFIELD ROYAL INFIRMARY. (285 Beds.) HUDDERSFIELD HOSPITAL MANAGEMENT COMMITTEE.** Applications are invited from provisionally registered medical practitioners for the post of HOUSE PHYSICIAN, to commence duties on 1st August, 1957. Salary in accordance with national scale.

Applications, together with copies of 3 recent testimonials, to be addressed to the undersigned as soon as possible.

H. J. JOHNSON, Secretary to the Management Committee.
The Royal Infirmary, Huddersfield.

**ILFORD. KING GEORGE HOSPITAL, Eastern-avenue, ILFORD.** There will be a vacancy for a HOUSE PHYSICIAN at above Hospital on 7th September, 1957. First or second post pre-registration. The post will be tenable for 6 months.

Applications, giving full particulars and accompanied by testimonials, should be sent to the undersigned within 7 days of the appearance of this advertisement.

H. F. HARRIS, Group Secretary,
Ilford and Barking Group Hospital Management Committee.
King George Hospital.

**ILFORD. KING GEORGE HOSPITAL.** There will be a vacancy for a SENIOR HOUSE OFFICER ANÆSTHETIST at above Hospital on 19th August. The Officer appointed will be required to be available for duty in other hospitals in the Group. Salary will be at the rate of £819 10s. p.a., less £150 p.a. emoluments.

Applicants should have been registered not less than 1 year, and should send applications, accompanied by copies of 3 testimonials, to the undersigned within 7 days of the appearance of this advertisement.

H. F. HARRIS, Group Secretary,
Ilford and Barking Group Hospital Management Committee.
King George Hospital, Ilford.

**HUNTINGDON COUNTY HOSPITAL.** Applications are invited for the post of HOUSE OFFICER (medical). Post recognised for pre-registration purposes. The selected candidate will be required to look after medical and paediatric cases and may be called upon to give emergency anæsthetics. Post vacant end July.

Apply, with full particulars and names of 2 referees, to Secretary, County Hospital, Huntingdon.

**IPSWICH AND EAST SUFFOLK HOSPITAL. Heath** ROAD WING, IPSWICH. (280 Beds.) Applications invited for RESIDENT SENIOR HOUSE OFFICER to Pædiatric Unit, vacant 25th August. Appointment recognised for D.C.H. and normally of 12 months tenure.

Applications, with full particulars and copies of 2 recent testimonials, to the Hospital Secretary.

**IPSWICH AND EAST SUFFOLK HOSPITAL. Heath** ROAD WING, IPSWICH. (280 Beds.) Post of HOUSE SURGEON (pre-registration), to 2 General Surgeons, now vacant. Recognised for R.C.S. examinations.

Applications, with full details and recent testimonials, to Hospital Secretary.

**IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea** ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to the Fracture and Orthopædic Department. Approved pre-registration post.

Applications, with copies of recent testimonials, to the Hospital Secretary.

**IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea** ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to the Senior Consultant General Surgeon. The post is recognised for pre-registration and for the F.R.C.S. examinations.

Applications, with copies of recent testimonials, to Hospital Secretary.

**IPSWICH AND EAST SUFFOLK HOSPITAL. Anglesea** ROAD WING. (356 Beds.) Applications are invited for the post of HOUSE SURGEON to the Consultant General Surgeon. The post is recognised for pre-registration and for the F.R.C.S. examinations.

Applications, with copies of recent testimonials, to Hospital Secretary.

**KETTERING AND DISTRICT GENERAL HOSPITAL.** Applications are invited for the post of HOUSE SURGEON (pre-registration). Post recognised for F.R.C.S.

Applications, stating age, experience and qualifications, together with copies of 3 recent testimonials, to be sent to the Group Secretary, General Hospital, Kettering.

**LINCOLN COUNTY HOSPITAL. (200 Beds.)** Applications are invited from pre-registration candidates for appointment as HOUSE PHYSICIANS for a period of 6 months. Vacant immediately.

Full particulars should be sent to—

R. W. HOWICK, Group Secretary.

**LINCOLN COUNTY HOSPITAL. (200 Beds.)** Applications are invited for the post of SENIOR HOUSE OFFICER in Surgery (vacant immediately) for a period of 6 months, to be followed, if satisfactory, by a further period of 6 months.

Full particulars should be sent to—

R. W. HOWICK, Group Secretary.

**LINCOLN COUNTY HOSPITAL. (200 Beds.)** Applications are invited from pre-registration candidates for appointments as HOUSE SURGEONS for 6 months to be followed if satisfactory by appointments as House Physicians for a further 6 months.

Full particulars should be sent to—

R. W. HOWICK, Group Secretary.

**LIVERPOOL, 20. BOOTLE HOSPITAL.** Applications are invited for a post as CASUALTY OFFICER (Junior Hospital Medical Officer grade) at this busy Hospital. The post will be vacant from 26th August, 1957. Recognised for F.R.C.S. Diploma.

Apply to Secretary, Walton Hospital, Liverpool, 9, giving details of experience, qualifications, age, date of registration and names of 2 referees.

**LEEDS REGIONAL HOSPITAL BOARD.** Senior Registrar vacancies.

SENIOR REGISTRAR in Psychiatry, Storthes Hall Hospital, Kirkburton, near Huddersfield (2600 Beds), and associated Clinics. Non-resident.

SENIOR REGISTRAR in Chest Diseases at the Leeds Chest Clinic. Duties will also include the supervision of cases of pulmonary tuberculosis at Killingbeck Hospital and of non-tuberculous chest diseases at the Leeds Public Dispensary and St. James's Hospital. The post is non-resident. The successful candidate will be expected to undertake certain duties in the Leeds General Infirmary where there will be opportunities for close association with the Department of Thoracic Surgery. Appreciable experience in general medicine is essential and in chest diseases desirable. A higher qualification will be an advantage.

Applications, stating age, qualifications, and details of appointments held (showing dates), and the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 15th August, 1957.

**LEEDS REGIONAL HOSPITAL BOARD.** Registrar vacancies.

*Anæsthetics*

(i) St. James's Hospital, Leeds (approximately 500 surgical beds). Recognised for F.F.A.R.C.S. Resident.

(ii) Hull A, Hull B and East Riding Groups. Recognised for the F.F.A.R.C.S. Duties may include thoracic anæsthesia. Non-resident. Vacant October.

(iii) Halifax Group (approximately 340 Beds in the surgical specialties) ; resident.

*General Medicine*

Hull A Group (294 general medical beds) and East Riding Group (78 general medical beds). Duties 6/11 Hull A and 5/11 East Riding. Holder to reside in Beverley.

*General Surgery*

Hull Royal Infirmary (80 general surgical beds) and other hospitals in the Hull A Group. Duties those of Resident Surgical Officer and includes additional duties in the Casualty Department.

*Infectious Diseases*

Leeds Road Hospital, Bradford (160 infectious diseases beds). Resident.

*Orthopædic Surgery*

(i) Marguerite Hepton Memorial Orthopædic Hospital, Thorp Arch, near Wetherby (78 long-stay children's beds). A 3-bedroomed partly furnished house is available in the Hospital grounds.

(ii) Harrogate General Hospital (38 orthopædic beds). Non-resident.

*Psychiatry*

(i) Menston Hospital, near Leeds (2500 Beds).

(ii) De la Pole Hospital, Willerby (1175 Beds), and associated clinics. Resident or non-resident.

If desired, facilities for attendance at Leeds University will be provided if the successful candidates are studying for the D.P.M.

Applications, stating age, qualifications and details of present and previous appointments with dates, together with the names and addresses of 3 referees, to the Secretary, Joint Registrars Committee, Park-parade, Harrogate, by 9th August, 1957.

**LEEDS. THE UNITED LEEDS HOSPITALS.** The GENERAL INFIRMARY AT LEEDS. REGISTRAR required for the Radiotherapy Centre. Candidates with D.M.R. preferred. The post will be tenable for 1 year in the first instance and renewable for a second. Terms and conditions of service for hospital medical staff apply.

Applications, stating age, qualifications, previous posts with dates, with 3 names for reference, should be sent to the Sub-Dean, School of Medicine, Leeds, 2, by Thursday, 1st August, 1957.

**LEEDS. THE UNITED LEEDS HOSPITALS.** The GENERAL INFIRMARY AT LEEDS. REGISTRAR to the Professorial Surgical Unit at the General Infirmary required. Possession of Final F.R.C.S. (England) not absolutely essential but should have primary F.R.C.S. examination. Salary and conditions of service as defined by Whitley Council.

Applications, stating age, qualifications, and experience, together with 3 names for reference, should be sent to the Sub-Dean, School of Medicine, Leeds, 2, not later than 30th July, 1957.

**LOUTH, LINCOLNSHIRE. COUNTY HOSPITAL.** (215 Beds.) GRIMSBY HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of SENIOR HOUSE OFFICER (surgical), vacant 31st August, 1957, at this General Hospital.

Applications, giving full details, together with the names of 2 referees, should be addressed to the Hospital Secretary.

**LOUTH. COUNTY HOSPITAL. (215 Beds.) Sheffield** REGIONAL HOSPITAL BOARD. Whole-time RESIDENT or NON-RESIDENT REGISTRAR (orthopædics and casualty) required. The appointment may include some duties in general surgery. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 8th August, 1957, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

**LOWESTOFT AND NORTH SUFFOLK HOSPITAL,** LOWESTOFT, SUFFOLK. SENIOR HOUSE SURGEON (resident) required immediately. Furnished flat available for married officer, if desired. Post recognised for Final F.R.C.S. examination requirements. The Hospital has a Consultant General Surgeon and is regularly visited by Consultants in all specialties from the Norfolk and Norwich Hospital. Membership of a Medical Defence Society is a condition of appointment.

Applications, stating age, qualifications and experience, with names and addresses of 2 referees, to Hospital Secretary.

**LLANELLY HOSPITAL, Llanelly. (162 Beds.) Glantawe** HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the post of JUNIOR HOSPITAL MEDICAL OFFICER in Anæsthetics at the above Hospital. Vacancy 1st October, 1957. The Hospital is recognised for the D.A. examination, and consideration is being given for recognition for the F.F.A.R.C.S. The successful candidate will be granted facilities to attend monthly anæsthetic lectures and discussions which are held at the Cardiff Royal Infirmary.

Applications, stating age, experience and qualifications together with the names of 2 referees, should be sent to the Secretary of the Hospital. T. E. JONES, Group Secretary.

**LANCASTER. ROYAL LANCASTER INFIRMARY.** (240 Beds.) SENIOR HOUSE OFFICER (medical). Duties include care of acute cases under the supervision of 2 Consultant Physicians and attendance at Consultative Clinics. The post is normally tenable for 1 year. Post vacant 1st September, 1957.

Applications, with names of 2 referees, to be addressed to the Group Secretary, Royal Lancaster Infirmary, Lancaster.

**LANCASTER. BEAUMONT HOSPITAL, Slyne-road.** SENIOR HOUSE OFFICER (infectious diseases). Hospital recognised for D.C.H. and contains a Pædiatric Unit, Dermatological Unit, Infectious Diseases Department and Pulmonary Tuberculosis Unit.

Applications, together with names of 2 referees, to Group Secretary, Royal Lancaster Infirmary, Lancaster.

**LUTON AND DUNSTABLE HOSPITAL, Luton, Bedfordshire.** SENIOR HOUSE OFFICER for Accident Service, including duties in the Hand Infection Unit, required 1st August, 1957. Post recognised for F.R.C.S.

Applications, stating age, nationality, qualifications and experience, together with copies of 3 recent testimonials, to be sent to the Secretary of the above Hospital as soon as possible.

**MAIDSTONE. KENT COUNTY OPHTHALMIC AND AURAL HOSPITAL.** (113 Beds.) MID-KENT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the appointment of SENIOR HOUSE SURGEON in the E.N.T. Department of the above Hospital. Post vacant 1st August, 1957. There are 55 E.N.T. beds and 6 specialist operating sessions each week. Valuable experience is available, and the post is recognised for the purpose of the F.R.C.S. and the D.L.O. Salary will be £819 10s. a year, less £150 a year for residential emoluments.

Applications to the Administrative Officer, Kent County Ophthalmic and Aural Hospital, Maidstone, Kent.

**MACCLESFIELD AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE.** HOUSE OFFICER in Surgery (pre-registration post). Acute Surgical Unit of 100 Beds. Recognised for F.R.C.S. purposes. Main casualty duties undertaken by Senior Resident Practitioner.

Apply immediately to Group Secretary, "Willerby House," Cumberland-street, Macclesfield.

**MANCHESTER, 8. CRUMPSALL HOSPITAL.** Applications are invited for the post of CASUALTY OFFICER (Senior House Officer) with duties in the Department of Orthopædic Surgery. Recognised for F.R.C.S. Vacant 8th August, 1957.

Applications, with names of 2 referees, by 5th August, 1957, to Group Secretary, North Manchester Hospital Management Committee, Crumpsall Hospital, Manchester, 8.

**MANCHESTER (near). ROYAL MANCHESTER CHILDREN'S HOSPITAL, PENDLEBURY, near MANCHESTER. SALFORD HOSPITAL MANAGEMENT COMMITTEE.** Applications invited for resident appointment of SURGICAL HOUSE OFFICER, vacant 1st August, 1957. Appointment is for a period of 6 months and is open to pre-registration graduates.

Applications, with testimonials or names of referees, to the Hospital Secretary within 10 days of appearance of this advertisement.

**MANCHESTER REGIONAL HOSPITAL BOARD.** Senior REGISTRAR in Urology, mainly at Salford Royal and the Royal Manchester Children's Hospitals and with some duties at Christie and Crumpsall Hospitals. Previous experience and higher qualifications essential.

Forms of application, obtainable from the Senior Administrative Medical Officer, Cheetwood-road, Manchester, 8, should be returned by 12th August, 1957.

**MANCHESTER REGIONAL HOSPITAL BOARD. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE.** The Board invite applications from registered practitioners for the post of ANÆSTHETIC REGISTRAR with duties in the South Manchester Group. The post is recognised by the Royal College of Surgeons for the F.F.A.R.C.S. and for the D.A.

Applications, stating age, qualifications, present post, experience, and names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20.

**MANCHESTER REGIONAL HOSPITAL BOARD. Blackburn ROYAL INFIRMARY.** REGISTRAR (medicine) required early September, 1957. Resident post. Duties at Royal Infirmary, Blackburn (262 acute beds) as arranged by Consultant Physician.

Application forms from Group Secretary, Hospital Management Committee Office, Royal Infirmary, Blackburn, Lancs.

**MANCHESTER REGIONAL HOSPITAL BOARD.** Applications are invited for a resident post of REGISTRAR in the Obstetric and Gynæcology Department in the Barrow and Furness Group of hospitals. The post will be available about the beginning of October next. 72 obstetric/gynæcological beds in main unit; outpatient departments and extensive surgical experience. Recognised for D.Obst.R.C.O.G.

Applications to Group Secretary, Barrow and Furness Hospital Management Committee, 105, Abbey-road, Barrow-in-Furness, not later than 10th August, 1957.

**MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13.** REGISTRAR in the Orthopædic Department, to commence as soon as possible. Appointment for 12 months, renewable.

Application form obtainable from the undersigned, to be returned not later than 10th August, 1957.

G. H. TAYLOR, Secretary.

**MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13.** RESIDENT MEDICAL OFFICER (Registrar grade) to commence as soon as possible. Whole-time resident appointment for 12 months, renewable. Applicants should have held house appointments and have had medical experience.

Application form obtainable from the undersigned, to be returned not later than 10th August, 1957.

G. H. TAYLOR, Secretary.

**MANCHESTER. UNITED MANCHESTER HOSPITALS. MANCHESTER ROYAL INFIRMARY, MANCHESTER, 13.** SENIOR HOUSE OFFICER to a General Medical Unit, to commence on 7th October, 1957. Whole-time, non-resident post, tenable for 6 months, renewable for a second and possibly a third 6 months.

Application form obtainable from the undersigned, to be returned by 10th August, 1957. G. H. TAYLOR, Secretary.

**MANCHESTER. UNITED MANCHESTER HOSPITALS. SAINT MARY'S HOSPITALS, MANCHESTER.** Applications are invited for 3 posts of SENIOR HOUSE OFFICER in Gynæcology. Applicants must have had previous hospital experience in medicine and surgery. The posts are recognised for the purpose of the M.R.C.O.G. examination. The appointments are for 6 months, starting 1st October, 1957. Salary in accordance with national scale.

Application forms may be obtained from the undersigned and returned not later than 6th August, 1957.

A. R. WISE, General Superintendent.
Saint Mary's Hospitals, Whitworth Park, Manchester.

**MANCHESTER. WEST MANCHESTER HOSPITAL MANAGEMENT COMMITTEE. PARK HOSPITAL, DAVYHULME.** (General Hospital—433 Beds.) HOUSE OFFICER (general surgery) required, pre-registration. Post recognised for F.R.C.S. examination. Post now vacant.

Application form from Secretary.

**MANCHESTER, 20. WITHINGTON HOSPITAL. South MANCHESTER HOSPITAL MANAGEMENT COMMITTEE.** Applications are invited for the post of RESIDENT CLINICAL PATHOLOGIST (Senior House Officer grade), vacant on 2nd September, 1957. Previous experience in pathology not essential, the post affording opportunities for gaining experience in all branches of clinical pathology.

Applications, stating age, qualifications, present post, experience, and the names of 2 referees, to be forwarded to the Group Secretary, Withington Hospital, Manchester, 20.

**MITCHAM, SURREY. WILSON HOSPITAL, Cranmer-road.** RESIDENT SENIOR HOUSE SURGEON (not recognised for F.R.C.S.), vacant 19th August. This post in small but busy general hospital provides good and varied experience in diagnosis, treatment and operative procedure.

Applications, stating age, qualifications and experience and the names of referees, to be sent to the Group Secretary, St. Helier Hospital, Carshalton, Surrey.

**NEATH GENERAL HOSPITAL, Neath. (412 Beds.)** Applications are invited for vacancies for HOUSE SURGEONS. This Hospital is recognised for the F.R.C.S. and approved by the General Medical Council for Pre-registration Service.

Applications, naming 2 referees, to be addressed to the Group Secretary, Mid-Glamorgan Hospital Management Committee, 8, Wind-street, Neath.

**NEWCASTLE REGIONAL HOSPITAL BOARD. Registrar ANÆSTHETIST** (whole-time), Hartlepools Group of hospitals—main hospitals, General (471 Beds), Cameron (73 Beds), Hartlepools (134 Beds). Married or single accommodation available.

Applications, with names and addresses of 3 referees, to Senior Administrative Medical Officer, Regional Hospital Board, Benfield-road, Newcastle upon Tyne, 6, within 14 days.

**NEWCASTLE REGIONAL HOSPITAL BOARD. Special AREA FOR CUMBERLAND AND NORTH WESTMORLAND. EAST CUMBERLAND GROUP OF HOSPITALS.** SURGICAL REGISTRAR (resident), whole-time, required for 1 year in the first instance, with the likelihood of extension. Main duties at the Cumberland Infirmary, Carlisle (322 Beds), where the Registrar will have duties in the Casualty Department and in the wards. The post is recognised under the F.R.C.S. regulations.

Applications, together with names and addresses of 1–3 referees and/or 1–3 testimonials, to the Senior Administrative Medical Officer, 72, Warwick-road, Carlisle, within 14 days.

**NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS.** Applications are invited for the whole-time appointment of SENIOR REGISTRAR in the Department of Anæsthetics. The post, which is non-resident except for rotational emergency duty, offers certain facilities for laboratory and clinical investigation. Applicants should have had considerable experience in anæsthesia and should hold the F.F.A.R.C.S. or the D.A. The appointment is subject to terms and conditions of service of hospital medical staff in the National Health Service.

Applications, giving full particulars and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.
Royal Victoria Infirmary, Newcastle upon Tyne.

**NEWCASTLE. THE UNITED NEWCASTLE UPON TYNE HOSPITALS.** Applications are invited for the whole-time, non-resident appointment of SENIOR REGISTRAR in the Department of Psychological Medicine at the Royal Victoria Infirmary under the direction of the Professor of Psychological Medicine. Applicants should possess either a Diploma in Psychological Medicine or a higher qualification in general medicine and psychiatric experience. The appointment is for 1 year in the first instance and will be subject to the terms and conditions of service of hospital medical staff in the National Health Service.

Applications, giving full details and the names and addresses of 3 referees, should be sent to the undersigned within 2 weeks of the appearance of this advertisement.

A. W. SANDERSON, House Governor and Secretary.
Royal Victoria Infirmary, Newcastle upon Tyne.

**NOTTINGHAM. CITY HOSPITAL. (811 Beds.)** Applications are invited for the post of HOUSE SURGEON, vacant 1st September, 1957. Recognised for pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

**NOTTINGHAM. CITY HOSPITAL. (811 Beds.)** Applications are invited for the post of HOUSE PHYSICIAN vacant on 1st September, 1957. Recognised for pre-registration purposes.

Applications, stating age, nationality, qualifications and experience, together with copies of not more than 3 testimonials, to be sent immediately to the Hospital Secretary, City Hospital, Hucknall-road, Nottingham.

**NOTTINGHAM GENERAL HOSPITAL.** 2 Senior HOUSE OFFICERS (medical) required; duties to commence end August and mid-September.

Applications, stating age, qualifications and experience, and nationality, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

**NOTTINGHAM GENERAL HOSPITAL.** Senior House OFFICER (surgery) required; duties to commence about mid-August.

Applications, stating age, qualifications and experience, and nationality, together with copies of testimonials, to be sent to the Group Secretary, General Hospital, Nottingham.

**NORTHWOOD, MIDDLESEX. MOUNT VERNON** HOSPITAL. (551 Beds.) NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR required in the X-ray Diagnostic Department at above Hospital for 1 year in first instance.

Application forms obtainable from, and returnable to, the Group Secretary, Harefield and Northwood Group Hospital Management Committee, Mount Vernon Hospital, Northwood, Middx, by 3rd August, 1957. Hospital may be visited by direct appointment.

**NEWMARKET GENERAL HOSPITAL.** Applications are invited for the post of HOUSE SURGEON, vacant 27th July, 1957. Duties include surgical house charge of general surgical and some eye cases. Post resident and available for 6 months, recognised for pre-registration.

Applications, with copies of 3 testimonials, to the Medical Superintendent.

**NEWMARKET GENERAL HOSPITAL.** Applications are invited for the post of HOUSE PHYSICIAN, vacant 28th August, 1957. Duties include house charge of general medical and pulmonary tuberculosis beds. The post is recognised for pre-registration, is resident, and tenable for 6 months. Salary in accordance with national scale.

Applications, with 3 recent testimonials, to Medical Superintendent.

**NEWPORT, MONMOUTHSHIRE. ROYAL GWENT** HOSPITAL. (260 Beds. 10 Residents. Recognised F.R.C.S.) SENIOR HOUSE OFFICER required for Casualty Department about 1st August, which is under the full-time charge of a Senior Hospital Medical Officer and there are also 2 Senior House Officers. The Department has recently been rebuilt and re-equipped, and all medical and surgical admissions pass through it. Tenable 6 or 12 months at candidate's option. Excellent experience.

Write, quoting 2 referees, to T. A. JONES, Group Secretary. 64, Cardiff-road, Newport, Mon.

**OSWESTRY. THE ROBERT JONES AND AGNES HUNT** ORTHOPÆDIC HOSPITAL. SENIOR SURGICAL HOUSE OFFICER (resident) required.

Apply Secretary immediately.

**OXFORD REGIONAL HOSPITAL BOARD.** Applications are invited for the post of REGISTRAR in Obstetrics and Gynæcology to the hospitals of the Aylesbury area. It is hoped that this post may be interchangeable with the Departments of Obstetrics and Gynæcology, United Oxford Hospitals, after the first year. The appointment is for 1 year, eligible for extension to a second year.

Applications, on forms obtainable from the Secretary, Registrar Committee, 43, Banbury-road, Oxford, must reach him by 8th August.

**OXFORD. UNIVERSITY OF OXFORD: UNITED** OXFORD HOSPITALS. Applications are invited for the whole-time post of SENIOR REGISTRAR in General Medicine. The appointment will be for 1 year in the first instance, and eligible for extension to the normal tenure. Applicants must hold a higher medical qualification.

Applications, on forms obtainable from the Secretary, Registrar Committee, 43, Banbury-road, Oxford, should reach him by 3rd August, 1957.

**OXFORD. UNITED OXFORD HOSPITALS.** Applications invited for the post of HOUSE OFFICER in the Oxford Eye Hospital, with effect from 1st October, 1957.

Applications, stating age, qualifications and experience, together with the names of 2 referees, to the Administrator, Radcliffe Infirmary, Oxford, by 10th August.

**PAISLEY AND DISTRICT HOSPITALS BOARD OF** MANAGEMENT. MATERNITY UNIT. HOUSE OFFICER required for term commencing 1st August, 1957. Applicants should preferably have held a previous hospital post.

Applications to Group Medical Superintendent, Royal Alexandra Infirmary, Paisley.

**PETERBOROUGH MEMORIAL HOSPITAL.** Surgical REGISTRAR. Appointment for 1 year, renewable for second year, provides wide range of work and experience. Recognised for F.R.C.S.

Applications, stating age, experience and the names of 3 referees, to Board's Senior Administrative Medical Officer, 117, Chesterton-road, Cambridge, by 8th August, 1957. Candidates invited to visit the Hospital by direct arrangement with Hospital Management Committee Secretary at the Hospital.

**PLYMOUTH. SOUTH DEVON AND EAST CORNWALL** HOSPITAL. SENIOR HOUSE OFFICER in Anæsthetics, vacant immediately. Recognised for the D.A. and F.F.A.R.C.S.

Applications, giving age, nationality and experience, with names of 3 referees, to be sent to—

F. HALL, Deputy Group Secretary, Plymouth,
South Devon and East Cornwall General Hospital Group.
7, Nelson-gardens, Stoke, Plymouth.

**PORT TALBOT GENERAL HOSPITAL, Hospital-road,** PORT TALBOT. (85 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (general surgery). The successful applicant will work under the supervision of the Consultant Surgeon based on Neath General Hospital, Neath.

Applications, naming 2 referees, to be addressed to the Group Secretary, Mid-Glamorgan Hospital Management Committee, 8, Wind-street, Neath.

**PORTSMOUTH GROUP HOSPITAL MANAGEMENT** COMMITTEE.

**Queen Alexandra Hospital**

SENIOR HOUSE OFFICER (general medicine and dermatology), vacant now.

HOUSE PHYSICIAN (78 medical beds) (pre-registration), vacant 30th July, 1957.

**Saint Mary's Hospital** (130 surgical beds)

HOUSE SURGEONS (pre-registration), vacant 30th July, 1957, and 11th August, 1957 (2).

HOUSE PHYSICIANS (74 medical beds) (pre-registration), vacant 30th July, 1957, 31st July, 1957 (2), and 13th August, 1957.

HOUSE OFFICER (53 paediatric beds), vacant 15th August, 1957.

**Royal Portsmouth Hospital** (61 medical beds)

HOUSE PHYSICIANS (pre-registration), vacant now and 10th August, 1957.

**Royal Portsmouth Hospital, Orthopædic Department** (104 Beds)

HOUSE OFFICER (pre-registration), vacant 27th August.

Applications, stating age, experience, and qualifications, together with the names of 2 referees, should be forwarded as soon as possible to E. H. HURST.

Saint Mary's Hospital, Milton-road, Portsmouth.

**REDHILL COUNTY HOSPITAL, Earlswood Common,** REDHILL. HOUSE SURGEON. Pre-registration post vacant 1st September, recognised for F.R.C.S. Medical or obstetric post to follow, subject to satisfactory service.

Apply to the Group Secretary, Redhill Hospital Management Committee, "Earlswood Mount," Pendleton-road, Redhill, Surrey.

**REDHILL COUNTY HOSPITAL, Earlswood Common,** REDHILL. OBSTETRIC HOUSE SURGEON. Post vacant 1st October, recognised for Pre-registration Service and for D.Obst.R.C.O.G.

Apply to the Group Secretary, Redhill Hospital Management Committee, "Earlswood Mount," Pendleton-road, Redhill, Surrey.

**ROCHDALE AND DISTRICT HOSPITAL MANAGE-** MENT COMMITTEE. SENIOR HOUSE OFFICER (medicine) (Assistant Resident Medical Officer rank) required at Birch Hill General Hospital. Medical residents include Resident Medical Officer and 3 House Physicians.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs.

**ROCHDALE AND DISTRICT HOSPITAL MANAGE-** MENT COMMITTEE. HOUSE PHYSICIANS (pre- or post-registration) required for Birch Hill General Hospital. Posts offer wide experience in general medicine. Staff of 5 residents in the medical department.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs.

**ROCHDALE AND DISTRICT HOSPITAL MANAGE-** MENT COMMITTEE. HOUSE SURGEONS (pre- or post-registration) required for Birch Hill Hospital and Rochdale Infirmary. 2 resident posts available. Duties consist of 2 months casualty and 4 months general surgery. Recognised for 6 months F.R.C.S. experience.

Apply at once to Group Secretary, Central Offices, Birch Hill Hospital, Rochdale, Lancs.

**ROMFORD, ESSEX. OLDCHURCH HOSPITAL.** (722 Beds.) RESIDENT HOUSE SURGEON required from 11th September, 1957, in the General Surgical Unit. Recognised for F.R.C.S. Open to either pre-registration applicants or to fully qualified practitioners. This very active Unit of a total of approximately 180 Beds affords ample opportunities for candidates to obtain first-class tuition and experience. The candidate appointed will be attached to a unit of approximately 60 beds.

Applications should be forwarded to the Group Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

**ROMFORD, ESSEX. OLDCHURCH HOSPITAL.** (722 Beds.) ORTHOPÆDIC HOUSE SURGEON (resident) required in the Orthopædic and Accident Unit immediately. The service consists of 100 beds equally divided between traumatic surgery and "cold" orthopædics. Post is recognised for pre-registration purposes and for F.R.C.S.

Applications to be sent to Group Secretary, Romford Hospital Management Committee, Oldchurch Hospital.

**ROMFORD, ESSEX. VICTORIA HOSPITAL. (99 Beds.)** RESIDENT HOUSE SURGEON (Male) required immediately. (Not pre-registration appointment.)

Applications should be forwarded to the Secretary, Romford Group Hospital Management Committee, Oldchurch Hospital, Romford.

**READING AND DISTRICT HOSPITAL MANAGEMENT** COMMITTEE. Applications are invited for the post of RESIDENT SENIOR HOUSE OFFICER (area Accident and Orthopædic Department), vacant immediately. Recognised for F.R.C.S. Duties including work in area Casualty Department at Battle Hospital, Reading (300 Beds). Person appointed will work with Registrar and House Officers.

Apply, stating nationality, present post, and qualifications with dates, together with names of 2 referees, to Group Secretary, 3, Craven-road, Reading.

**READING AREA DEPARTMENT OF MEDICINE.** Applications are invited from registered and provisionally registered medical practitioners for 2 posts as RESIDENT HOUSE PHYSICIAN vacant 1st September, 1957, for a period of 6 months. Successful candidates will be required to carry out duties at the following Reading Hospitals: Royal Berkshire Hospital (398 Beds), Battle (374 Beds) and Prospect Park (104 Beds).

Write immediately, stating age, qualifications with dates, nationality, present post, with copies of 2 recent testimonials, to Secretary, Royal Berkshire Hospital, Reading.

**READING. BATTLE HOSPITAL.** (391 Beds.) Applications are invited from registered medical practitioners for the post of RESIDENT JUNIOR HOUSE SURGEON in the Accident and Orthopædic Department. Post vacant 1st August. F.R.C.S. recognised. Also casualty duties.

Apply, stating age, qualifications with dates, nationality, present post, with 1 copy of recent testimonial, to Hospital Secretary.

**READING. ROYAL BERKSHIRE HOSPITAL.** (398 Beds.) Applications are invited from registered and provisionally registered medical practitioners, Male and Female, for resident post of HOUSE SURGEON, vacant 1st September, 1957, and tenable for 6 months.

Write, before 15th August, stating age, qualifications with dates, nationality, present post, with copies of 2 recent testimonials. to Secretary.

**READING. ROYAL BERKSHIRE HOSPITAL.** (398 Beds.) READING AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE. Applications are invited from registered and provisionally registered medical practitioners for the resident post of HOUSE PHYSICIAN in the Pædiatric Department, vacant 1st September, 1957, and tenable for 6 months.

Write, stating age, qualifications with dates, nationality, present post, with copy of 1 recent testimonial, to Secretary.

**SCOTLAND. NORTH-EASTERN REGIONAL HOSPITAL BOARD.** Applications are invited for the post of SENIOR REGISTRAR in General Medicine on the staff of the Aberdeen General Hospitals. The appointment is for a period of 1 year in the first instance.

Applications, giving 2 names for reference, should be submitted by 10th August, 1957, to the Secretary, 1, Albyn-place, Aberdeen, from whom further particulars may be obtained.

**SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.** Applications are invited for an appointment as Whole-time ORTHOPÆDIC REGISTRAR with opportunity for general surgical work, in the Orpington and Sevenoaks Group of hospitals. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, London, W.1, not later than 15th August, 1957.

**SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.** Applications are invited for a whole-time appointment as RESIDENT SURGICAL OFFICER to fill a vacancy in the approved establishment at the Tunbridge Wells Group of hospitals. The salary will be £1061 10s. p.a. and the appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance, renewable for a further year.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 10th August, 1957.

**SOUTH EAST METROPOLITAN REGIONAL HOSPITAL BOARD.** Applications are invited for an appointment as Whole-time REGISTRAR in General Medicine to fill a vacancy in the approved trainee establishment at the Bromley, Kent Group of hospitals. The appointment will be in accordance with the terms and conditions of service of hospital medical and dental staffs (England and Wales), and will be for 1 year in the first instance.

Applications, giving particulars of age, qualifications and experience with relevant dates, together with the names and addresses of 2 referees, to be sent to the Secretary, Registrars Committee, South East Metropolitan Regional Hospital Board, 11, Portland-place, W.1, not later than 10th August, 1957.

**SWANSEA HOSPITAL, Swansea.** (413 Beds.) GLANTAWE HOSPITAL MANAGEMENT COMMITTEE. Applications are invited for the resident post of HOUSE OFFICER in the Medical Unit of the above Hospital. The post is recognised for pre-registration purposes. Immediate vacancy.

Applications, with full particulars, should be sent to the Secretary of the Hospital. T. E. JONES, Group Secretary.

**SWANSEA. MOUNT PLEASANT HOSPITAL.** (236 Beds.) GLANTAWE HOSPITAL MANAGEMENT COMMITTEE. Registered medical practitioners are invited to apply for the resident appointment of JUNIOR HOSPITAL MEDICAL OFFICER for work in the Medical and Surgical Departments, and in the Chronic Sick Wards of the above Hospital.

Applications, stating age, experience, and qualifications, with copies of 2 recent testimonials, should be addressed to the Hospital Secretary.

**SWINDON AND DISTRICT HOSPITAL MANAGEMENT COMMITTEE.** Applications invited for the appointment of SENIOR HOUSE OFFICER as Casualty Officer and Orthopædic House Surgeon at Great Western Hospital, Swindon. Post recognised by R.C.S. for 6 months of years training under Fellowship regulations. Work of Accident and Orthopædic Department, associated with Nuffield Orthopædic Centre (Wingfield Morris Orthopædic Hospital), Oxford, includes large number of industrial injuries. Salary £819 10s. p.a., less charge for residential emoluments.

Full details and names of 3 referees to Secretary, 7, Okus-road, Swindon, Wilts, immediately.

**SHREWSBURY. SHELTON MENTAL HOSPITAL.** (1000 Beds.) SHREWSBURY HOSPITAL GROUP. JUNIOR HOSPITAL MEDICAL OFFICER. Appointment for 1 year in first instance. Residential accommodation available. Recognised for D.P.M.

Applications to Medical Superintendent.

**SHEFFIELD REGIONAL HOSPITAL BOARD.** Whole-time NON-RESIDENT SENIOR REGISTRAR (psychiatry) required for duties at the Towers Hospital, Leicester, and at the Children's Psychiatric Clinics in Leicester and Leicestershire. Possession of D.P.M. essential. Appointment for 1 year in first instance reviewable annually.

Application forms and further details from Senior Administrative Medical Officer, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield. Forms to be returned by 8th August, 1957.

**ST. ALBANS (near), HERTFORDSHIRE. SHENLEY HOSPITAL.** Applications are invited for the post of SENIOR HOUSE OFFICER (Psychiatrist), resident or non-resident, for 1 year in the first instance, at Shenley Hospital, 16 miles from London. Opportunity for work with neurotic as well as psychotic patients. The Hospital may be visited by appointment.

Applications to the Medical Superintendent.

**ST. ASAPH HOSPITAL, St. Asaph. Appointment of HOUSE OFFICER.** Duties divided between ophthalmology (16 Beds), E.N.T. (12 Beds), and oral surgery (4 Beds).

Applications, stating age, qualifications and experience, accompanied by 2 recent testimonials, to be sent forthwith to the Group Secretary, Clwyd and Deeside Hospital Management Committee, "Rhianfa," Russell-road, Rhyl.

**STOKE-ON-TRENT. CITY GENERAL HOSPITAL.** HOUSE OFFICER (pædiatrics) required, vacant very shortly. Pre-registration post.

Detailed applications, with copy testimonials, to Group Secretary, Princes-road, Stoke-on-Trent.

**TAPLOW, near MAIDENHEAD. CANADIAN RED CROSS MEMORIAL HOSPITAL.** Applications invited for post of HOUSE PHYSICIAN to Special Unit for research in Juvenile Rheumatism. Post offers scope for those interested in research, pædiatrics, rheumatology or cardiology.

Applications, stating age, qualifications and experience, with copies of 2 testimonials, to Secretary.

**TAUNTON AND SOMERSET HOSPITAL. Applications** are invited for the post of SENIOR HOUSE OFFICER (casualty and orthopædic), vacant now.

Applications, stating age, nationality and qualifications together with the names of 2 referees, should be forwarded to the Group Secretary, Taunton Hospital Management Committee, Taunton and Somerset Hospital, Musgrove Park Branch, Taunton, Somerset.

**TUNBRIDGE WELLS (near). PEMBURY HOSPITAL,** PEMBURY. Applications invited for appointment of HOUSE SURGEON (Senior House Officer) to Orthopædic Unit. Post vacant 13th August, 1957. Recognised F.R.C.S. (Eng.) and tenable for 1 year. Includes treatment of long and short stay cases and traumatic surgery with large outpatient and fracture clinics under 2 Consultants.

Apply, stating age, qualifications and experience, together with 3 testimonials, to Group Secretary, Sherwood Park, Pembury-road, Tunbridge Wells.

**WARRINGTON GENERAL HOSPITAL.** (344 Beds.) Applications are invited for the post of SENIOR HOUSE OFFICER (pædiatrics), Male or Female. Post recognised for D.C.H. The post will become vacant on 1st October, 1957. Scale of salary £819 10s. p.a., less a deduction of £150 p.a. for residential emoluments.

Applications to be forwarded to—

HENRY L. BOOT, Group Secretary,
Warrington and District Hospital Management Committee.
c/o General Hospital, Warrington, Lancs.

**WARWICK (near). KING EDWARD VII MEMORIAL CHEST HOSPITAL, HERTFORD HILL,** near WARWICK. (228 Beds.) JUNIOR HOSPITAL MEDICAL OFFICER (resident). Applications are invited for this appointment in a modern Thoracic Surgical Unit. All forms of major and minor thoracic surgery undertaken. Post offers wide general training in cardiac, œsophageal, and pulmonary surgery. Facilities available for post-graduate study. Previous experience in specialty is not essential.

Applications to Medical Superintendent.

**WEST DORSET GROUP HOSPITAL MANAGEMENT COMMITTEE.** Applications are invited for 2 resident 6-monthly posts of HOUSE SURGEON (Male or Female) at :—

(*a*) WEYMOUTH AND DISTRICT HOSPITAL (124 Beds).
(*b*) DORSET COUNTY HOSPITAL, DORCHESTER (109 Beds).

Both posts are recognised for the F.R.C.S. examination ; approved for Pre-registration Service, and become vacant 1st August, 1957.

Applications, stating age, qualifications, experience and nationality, together with copies of testimonials, to the Group Secretary, West Dorset Hospital Management Committee, Damers-road, Dorchester, Dorset, immediately.

**WALSALL HOSPITAL MANAGEMENT COMMITTEE. MANOR HOSPITAL.** (333 Beds.) GYNÆCOLOGICAL AND OBSTETRIC HOUSE SURGEON. Post recognised for D.Obst.R.C.O.G. Vacancy 1st September.

Applications to Group Secretary, General (Sister Dora) Hospital, Walsall.

**WATFORD AND DISTRICT PEACE MEMORIAL HOSPITAL.** NORTH WEST METROPOLITAN REGIONAL HOSPITAL BOARD. REGISTRAR in Radiology required for the above Hospital. Post recognised for the D.M.R.D. Hospital may be visited by direct appointment. Post vacant immediately.

Application form obtainable from, and returnable to, the Secretary, West Herts Group Hospital Management Committee, 9, Rickmansworth-road, Watford, Herts, by not later than 10 days after appearance of this advertisement.

**WEAVERHAM, CHESHIRE. HEFFERSTON GRANGE SANATORIUM.** (162 Beds—Pulmonary tuberculosis.) RESIDENT SENIOR HOUSE OFFICER required.

Applications to Group Secretary, North and Mid-Cheshire Hospital Management Committee, The Hospital, Sinderland-road, Altrincham, with names of 2 referees, as soon as possible.

**WAKEFIELD. PINDERFIELDS GENERAL HOSPITAL.** Applications invited from registered medical practitioners for post of JUNIOR HOSPITAL MEDICAL OFFICER in Anæsthetics (recognised for D.A. and F.F.A.R.C.S.). The post offers wide experience, as large Orthopædic and Thoracic Units are located in the Hospital in addition to the general surgical and gynæcological wards. Appointment may be either resident or non-resident. If resident, a charge at the rate of £170 p.a. will be made.

Address written applications, stating age, nationality, qualifications with dates, experience, details of previous appointments, and 2 names and addresses for reference, to—

W. BOWRING, Group Secretary.

Pinderfields General Hospital, Wakefield.

**WAKEFIELD. PINDERFIELDS GENERAL HOSPITAL.** SENIOR HOUSE OFFICERS required for the Orthopædic Surgery Department. Salary £819 10s. p.a. £150 p.a. charged for accommodation.

Address written applications, giving full particulars of experience and 2 names and addresses for reference, to—

W. BOWRING, Group Secretary.

Pinderfields General Hospital, Wakefield.

**WELSH REGIONAL HOSPITAL BOARD.**

REGISTRAR (general surgery), Maelor General and War Memorial Hospitals, Wrexham. Resident/non-resident. Hospital recognised for F.R.C.S.

REGISTRAR in General Surgery, Morriston Hospital, Morriston, near Swansea. Duties offer good experience in general surgery and urology. Hospital recognised for F.R.C.S. Resident/non-resident.

REGISTRAR (general surgery), Pembroke County War Memorial Hospital, Haverfordwest. Resident or non-resident.

Subject to review end of first year.

Application forms from Senior Administrative Medical Officer, Temple of Peace, Cathays Park, Cardiff, within 14 days.

**WHITEHAVEN HOSPITAL, Cumberland. (119 Beds.** Pre-registration post. Recognised F.R.C.S.(Ed.).) HOUSE SURGEON (first, second or Senior House Officer post), vacant middle of August.

Detailed applications, with dates, and names of 2 referees, to Secretary, Workington Infirmary, Cumberland.

**WIGAN AND LEIGH HOSPITAL MANAGEMENT** COMMITTEE.

**Royal Albert Edward Infirmary, Wigan**

3 HOUSE SURGEONS.
HOUSE PHYSICIAN.

**Leigh Infirmary**

HOUSE SURGEON.

All pre-registration posts—becoming vacant shortly.

Applications, with names of 2 referees, to the Secretary, Knowsley House, Wigan.

**WORKSOP. VICTORIA HOSPITAL. (122 Beds.)** SHEFFIELD REGIONAL HOSPITAL BOARD. Whole-time RESIDENT REGISTRAR (orthopædics and casualty) required. Appointment for 1 year in first instance.

Apply to Secretary, Sheffield Regional Hospital Board, Old Fulwood-road, Sheffield, by 8th August, 1957, giving age, nationality, qualifications, present and previous appointments with dates, naming 3 referees.

**WREXHAM. MAELOR GENERAL HOSPITAL. (591** Beds.) Applications are invited for the post of HOUSE SURGEON at the above Hospital, to commence duties on 1st August, 1957. The appointment is recognised for the Diploma of F.R.C.S. (Eng. and Edin.) and is a pre-registration post.

Applications, stating age, nationality, qualifications and experience, with copies of 2 recent testimonials, to be sent to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

**WREXHAM. WAR MEMORIAL HOSPITAL. (230 Beds.)** Applications are invited for the post of SENIOR HOUSE OFFICER in the Orthopædic Department of the above Hospital. The post is a residential one and affords particular facilities for postgraduate study. Successful applicant will be allowed to attend for 2 days a month at the Robert Jones and Agnes Hunt Orthopædic Hospital, Oswestry. The Hospital is recognised for the Diploma of F.R.C.S. (Eng. and Edin.).

Applications, stating age, nationality, qualifications, and experience, together with copies of 2 recent testimonials, to be addressed to the Group Secretary, Maelor General Hospital, Wrexham, as soon as possible.

**YORK MILITARY HOSPITAL (Civilian Wing). (60** Beds.) SENIOR HOUSE OFFICER required from 10th August, 1957, resident or non-resident. There are 30 general surgical beds and 30 medical beds. The Hospital is associated with the County Hospital (General Hospital of 269 Beds) where relief casualty and emergency work and relief work for House Surgeons may be undertaken and where residence can be provided. Salary £819 10s. p.a., less £150 p.a. if resident.

Applications, stating age, nationality, experience, qualifications, and names of 2 referees, to Group Secretary, York A and Tadcaster Hospital Management Committee, Bootham Park, York, immediately.

**U.S.A. ST. MARY'S MEMORIAL HOSPITAL, Knoxville,** TENNESSEE, U.S.A. Required, RESIDENT and/or ASSISTANT in Pathology. 380-Bed General Hospital, large volume and variety morbid anatomy and clinical pathology. Department approved for resident training by American Board of Pathology. Resident pay begins $250 monthly, plus full maintenance. Salary for Assistant depends on qualifications, minimum $500 monthly. Minimum requirements for applicants: Resident, graduate from a medical school in the United Kingdom listed as approved by American Medical Association Council on Medical Education plus a year hospital work comparable with American interneship; Assistant, same as above, plus 3 or more years specialised training in pathology. Will consider defraying transportation expense.

Full details on request to GEORGE S. MAHON, M.D., Pathologist.

**U.S.A. CAMBRIDGE, MASSACHUSETTS.** Applications are invited for the positions of RESIDENCIES in Anesthesia for a 2-year period beginning 1st July and 1st September, 1957. Salary $1800 first year and $3600 second year and full maintenance. Training in all branches of anesthesia. Affiliation with other hospitals.

Applications, stating age, nationality, qualifications, and experience, together with the names of their referees, should be forwarded to the Director of Anesthesiology, P.O. Box 89, Cambridge, Massachusetts. Travelling expenses to and from the U.S.A. will be paid. Particulars will be sent as soon as application is received. Please enclose recent photograph with application.

**B.W.I. UNIVERSITY COLLEGE HOSPITAL OF THE** WEST INDIES. Applications are invited for the post of REGISTRAR in Anæsthetics at the above-named teaching Hospital. The successful candidate will be required to take up duties as early as possible. The appointment will be for 1 year in the first instance subject to renewal. Salary will be in the scale of £900–£100–£1100: £1200–£100–£1500 p.a. depending on experience and qualifications. If available, an unfurnished flat will be provided at a deduction of 5% of salary; otherwise a living-out allowance will be paid by the Board. Passage will be provided for 1 person only by sea from the country of recruitment.

Further information may be obtained from the Hospital Manager and Secretary, University College Hospital of the West Indies, Mona P.O., Jamaica B.W.I., to whom applications, stating age, nationality, details of qualifications and experience, together with 3 recent testimonials or the names and addresses of 3 referees, should be sent by 17th August, 1957.

**B.W.I. UNIVERSITY COLLEGE HOSPITAL OF THE** WEST INDIES. Applications are invited for the post of SENIOR REGISTRAR in the Division of Surgery at the above-named Teaching Hospital. The successful candidate will be required to commence duty on or about 1st January, 1958. The appointment will be for 1 year in the first instance, subject to renewal. Salary will be within the scale £1200–£100–£1500 p.a., depending on experience and qualifications. If available, an unfurnished flat will be provided at a deduction of 5% of salary, otherwise a living-out allowance will be paid by the Board. Return passages by sea will be paid for 1 person only from and to the country of recruitment.

Further information may be obtained from the Hospital Manager and Secretary, University College Hospital of the West Indies, Mona P.O., Jamaica, B.W.I., to whom application, stating age, nationality, and details of qualifications and experience, together with 3 recent testimonials or the names and addresses of 3 referees, should be sent by 31st August, 1957.

## Public Appointments

**BIRMINGHAM. CITY OF BIRMINGHAM. Public** HEALTH DEPARTMENT. Applications invited from registered medical practitioners for post of ASSISTANT ADMINISTRATIVE MEDICAL OFFICER OF HEALTH (Male or Female). Candidates should hold the Diploma in Public Health. The successful candidate will have an opportunity to gain administrative experience in all branches of the Public Health Service, including maternity and child welfare. Salary scale £1405–£55–£1625 p.a. Commencing salary within the scale will depend upon the Medical Officer's experience. Pension scheme (including Widows and Orphans); medical examination. The officer appointed will be required to devote his/her whole-time to official duties and the appointment will be subject to 3 months notice on either side.

Applications, with the names of 3 persons to whom reference may be made, to be sent to the Medical Officer of Health, Council House, Birmingham, 3, not later than 8th August, 1957.

**DURHAM COUNTY COUNCIL. Applications invited** from registered medical practitioners (Men and Women) for appointment as SCHOOL MEDICAL OFFICER. Applicants must have had at least 3 years experience in the practice of their profession. Salary scale £1050–£50–£1200–£55–£1475 p.a.

Further details and form of application from undersigned. Completed applications by 31st August, 1957.

G. H. METCALFE, Director of Education.

Shire Hall, Durham, 12th July, 1957.

**GOVERNMENT OF THE EASTERN REGION OF** NIGERIA. Applications invited from doctors with medical qualifications registrable in the United Kingdom for the following posts:—

MEDICAL OFFICERS for general medical duties in urban and rural areas.

MEDICAL OFFICERS OF HEALTH for administration of environmental hygiene, maternal and child welfare, school health, health education and control of communicable diseases. Women eligible, and would be encouraged to concentrate on school health and welfare duties. At present emphasis is being placed on development of a School Health Service and on tuberculosis control. Officers may be required to visit rural areas around the township where their principal responsibility lies. Candidates must possess D.P.H.

Appointments on contract with gratuity (taxable) payable on completion of satisfactory engagement at rate of £37 10s. for each completed period of 3 months service (including leave). Salary scale £1344–£2118 a year for Medical Officers and £1434–£2118, plus £100 a year Staff pay, for Medical Officers of Health.

Quarters provided at rental of 10% of salary. Taxes at local rates. Annual local leave permissible; generous home leave after each tour. Free return passages for Officer and wife; and, when appropriate, either (but not both) of the following in any 1 tour of service:—

(*a*). 1 return sea passage for each of 2 children under age 18 subject to maximum of £75 for the return journey for each child, or

(*b*) An allowance of £75 a year for each of 2 children under age 18 maintained outside Nigeria for the whole tour.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD. 117/411/016).

**GOVERNMENT OF WESTERN NIGERIA.** Applications invited from Male doctors for following posts in the Medical Department of the Western Region of Nigeria :—

MEDICAL OFFICER for general medical work including emergency surgery in district hospitals and general health work including supervision of rural schools, maternity and child welfare clinics.

MEDICAL OFFICERS OF HEALTH who will normally be based at 1 of the larger urban centres in the Region, where they will be primarily responsible for public health administration of the area, with emphasis on sanitation and hygiene. Duties include school health, public health, education and propaganda, control of quarantinable diseases and possibly establishment and supervision of maternity, child welfare and tuberculosis centres. A candidate with special aptitude for teaching may be selected to take charge of new School of Hygiene for training of Sanitary Inspectors at Ibadan. Candidates should hold Diploma in Public Health.

PATHOLOGIST to organise and supervise a Regional Laboratory Service. Most hospitals in Region have small laboratories attached where routine work is performed, but the more complicated tests, sections, &c., will be the selected officer's concern at a Central Regional Laboratory. He will have to supervise and encourage the work of African Technicians which will necessitate travelling. Candidates should possess Diploma in Pathology or equivalent qualification, and have had 2 years experience in laboratory work.

Appointments may be :—

(*a*) From National Health Service, candidate retaining superannuation rights up to 6 years. Salary scale £1086–£1950 a year, and gratuity (taxable) of 20% of aggregate salary on completion of appointment, or

(*b*) On short-term contract. Salary scale £1290–£2286 a year, and gratuity (taxable) at rate of £37 10s. for each completed period of 3 months service (including leave) payable on satisfactory completion of appointment.

Entry point in both cases determined by qualifications and experience. In addition, officers receive supplementary pay of £120 a year.

Quarters provided at low rental. Taxes at local rates. Annual leave permissible : generous home leave after each tour of 18–24 months. Free return passages for Officer, wife, and children (up to 3).

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD.117/410/018).

**GOVERNMENT OF THE FEDERATION OF NIGERIA.** MEDICAL OFFICER OF HEALTH required for administration of public health and control of sanitary matters, or if posted to sea or airport, the duties of Port Health Officer. May be required to perform general duties of Medical and Health Officer and other duties in connection with epidemic diseases. Must possess medical qualifications registrable in the United Kingdom and D.P.H. Appointment :—

(*a*) On short-term contract with inclusive salary from £1536 to £2286 p.a. On completion of contract gratuity (taxable) is paid of £37 10s. for each completed period of 3 months service (including leave).

(*b*) From National Health Service with inclusive salary from £1326 to £1950 p.a., candidate retaining superannuation rights and receiving gratuity (taxable) of 20% of aggregate of salary.

Quarters at low rental. Free return passages for Officer and wife. Return passages for children, to age 18, provided cost does not exceed that of 2 adult return passages in any 1 tour of service. Children's (Separate Domicile) allowance of £75 a year for each child under 18, ceasing if children join parents in Nigeria. Income-tax at local rates. Local leave permissible and generous home leave after each tour.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD. 117/14/07).

**GOVERNMENT OF THE FEDERATION OF RHODESIA** AND NYASALAND. MINISTRY OF HEALTH. Vacancies : GOVERNMENT MEDICAL OFFICERS (Male). As a result of continued expansion in the Medical Services of the Federation further vacancies exist for Government Medical Officers. These are essentially general duty posts and applicants must have completed 1 years experience since qualifying. Minimum commencing emoluments including allowances in lieu of private practice vary between £1450 and £1650 p.a. according to experience. The maximum basic salary on this grade is £1850 but opportunities exist for transfer to centres with private practice benefits or promotion to higher grades.

Application forms and further details may be obtained from the Secretary (R), Rhodesia House, 429, Strand, London, W.C.2. Closing date 17th August.

**LONDON TRANSPORT EXECUTIVE.** Applications are invited from registered medical practitioners for a post of MEDICAL OFFICER. The successful applicant will be responsible to Chief Medical Officer for general clinical work and medical supervision of working conditions. Preference given to applicants who possess a Diploma in Public or Industrial Health. Commencing salary £1575 p.a. Appointment subject to medical examination. Contributory superannuation scheme after probation.

Applications, giving full details of qualifications and experience, together with the names of 3 referees, should be sent within 14 days of the appearance of this advertisement to the Recruitment and Training Officer (F/EV 642), London Transport Executive, 55, Broadway, S.W.1.

**NEWPORT. COUNTY BOROUGH OF NEWPORT.** ASSISTANT MEDICAL OFFICER (Female). Applications for the above position are invited from women who are registered medical practitioners, preferably holding a Diploma in Public Health, or Child Health. Salary £1050–£1475 p.a.

Applications, on forms to be obtained from the undersigned, to be received by 24th August, 1957. Canvassing, directly or indirectly, will disqualify.

W. B. CLARK, Medical Officer of Health.

Civic Centre, Newport, Mon.

**FACTORY DOCTORS.** Factories Acts, 1937 and 1948. The following appointment as Appointed Factory Doctor is vacant. Apply to Chief Inspector of Factories, 19, St. James's-square, London, S.W.1.

| *District* | *County* | *Latest date for receipt of applications* |
|---|---|---|
| LINSLADE .. | BUCKINGHAM .. | 10TH AUGUST, 1957 |

**FEDERATION OF RHODESIA AND NYASALAND.** MINISTRY OF DEFENCE. Vacancies. MEDICAL OFFICERS. Corrected Rates of Pay. Applications are invited for appointment as full-time Medical Officers in the Rhodesia and Nyasaland Medical Corps. Successful applicants (age limit 40 years) will be required to attest in and serve as Regular Officers in the Corps. Appointments are in the rank of Captain on scale : First year £1371, second year £1410, third year £1452, fourth year £1491, fifth year £1530, sixth year £1572, seventh year £1621, eighth year £1672, ninth year £1722, tenth year £1800, eleventh year £1851, twelfth and subsequent years £1899. In addition to the foregoing, a professional allowance of £200 p.a. will be paid. A married Officer may also be paid up to a maximum of £240 p.a. quarters allowance, if Government quarters are not provided. Children's allowances are payable, if applicable. Promotion to higher rank will be in accordance with the requirements of the service. The officers will be on the staff of the Director of Medical Services.

Applications should be addressed to the Federal Military Liaison Officer, Rhodesia House, 429, Strand, London, W.C.2, who will arrange an appointment to discuss the career offered.

**HER MAJESTY'S OVERSEAS CIVIL SERVICE.** Medical OFFICERS with qualifications registrable in United Kingdom required for general duties in the South Pacific Health Service which includes posts in Fiji, the British Solomon Islands Protectorate, Gilbert and Ellice Islands and New Hebrides. Selected candidate would be posted to Fiji in first instance unless urgently required elsewhere in the South Pacific Health Service. Appointment on permanent basis with pension (non-contributory). Salary scale £F960–£F1850 p.a. (£F111 = £100 sterling). Starting salary according to experience. Quarters, if available, at low rental or hotel allowance in lieu for limited period. Income-tax at local rates. Free passages for Officer, wife, and children up to cost of 4 adult passages. Leave passages up to 3 adult fares. Educational facilities available in Fiji.

Application forms from Director of Recruitment, Colonial Office, London, S.W.1 (quoting No. BCD. 117/162/01).

**HER MAJESTY'S OVERSEAS SERVICE. Tanganyika.** MEDICAL OFFICERS with qualifications registrable in United Kingdom required for general duties. Officers would normally be based on a hospital but must be prepared to tour and to assist in training African staff. Professional work covers a wide field in all branches of medicine, surgery and obstetrics with much individual responsibility. Ample opportunities for sport and recreation. Appointment can be made on permanent basis with pension (non-contributory), or on short-term contract with gratuity (taxable) on satisfactory completion of service. National Health Service Doctor may retain superannuation rights (up to 6 years) and receive gratuity (taxable) of 20% of aggregate salary after engagement. Salary ranges from £1284 to £2115 a year, starting point determined by experience. 4 extra increments given for approved higher qualifications. Permanent officers can be members of Her Majesty's Overseas Civil Service and are eligible to be considered at any time for promotion to higher salaried posts in Tanganyika and other territories in medical administration or, if they possess higher qualification and suitable experience, in specialist posts. Quarters generally available at rental of £30–£78 a year according to size and type, furniture £12–£24 a year. Free passages in both directions for Officer and wife and up to cost of 1 adult fare for children. Taxation at local rates. Annual local leave permissible and generous home leave after each tour of from 30 to 36 months. Educational facilities.

Application forms from Director of Recruitment, Colonial Office, Great Smith-street, London, S.W.1 (quoting No. BCD. 117/8/02).

**LUTON. BOROUGH OF LUTON.** Assistant Medical OFFICER. Applications are invited for this appointment. Salary scale : £1050–£50–£1200–£55–£1475. Commencing salary within the scale will be commensurate with qualifications and experience. Car allowance payable. Preference will be given to applicants possessing a Diploma in Public Health. Duties will include work in connection with School Health Services, hospital treatment of infectious diseases, and Part III Personal Health Services.

Full particulars and conditions of appointment obtainable from the Medical Officer of Health, Public Health Department, 63/69, Guildford-street, Luton, to whom applications should be delivered by 6th August, 1957.

Town Hall, Luton. A. D. HARVEY, Town Clerk.

**NORFOLK COUNTY COUNCIL.** Applications are invited from registered medical practitioners holding the Diploma in Public Health for appointment as SENIOR ASSISTANT MEDICAL OFFICER on headquarters staff. In addition to administrative work, the duties will include the medical examination of staff and deputising for other medical officers. The salary scale will be £1343 10s.–£52 10s.–£1606. Travelling and subsistence allowances will also be paid.

Application forms, together with further particulars of the post, can be obtained from the County Medical Officer, 29, Thorpe-road, Norwich, to whom completed applications should be sent not later than 14th August, 1957.

**MANCHESTER EDUCATION COMMITTEE.** School HEALTH SERVICE. CONSULTANT PSYCHIATRIST required to work full-time in the Child Guidance Service. Salary scale £1800–£3100 p.a. Commencing salary according to qualifications and experience.

Application forms and further particulars (stamped addressed envelope) from Chief Education Officer, P.O. Box 480, Manchester, 3, returnable to the Town Clerk, Town Hall, Manchester, 2, by 17th August, 1957.

**MANCHESTER. CITY OF MANCHESTER HEALTH** DEPARTMENT. MEDICAL OFFICERS (maternity and child welfare). Applications are invited from registered medical practitioners (Male or Female) for the above positions on the permanent staff. Applicants should have obstetric and pædiatric experience and will be required to undertake duties principally in Maternity and Child Welfare Clinics. Possession of the D.Obst.R.C.O.G., D.P.H., or D.C.H. qualifications will be an advantage. Salary scale £1050 rising to £1475 p.a. The appointment is subject to a medical examination and the City Council's conditions of service.

Application forms obtained on request, must be returned to the Town Clerk, Town Hall, Manchester, 2, and not to any member of the Council, within 21 days of the appearance of this advertisement. Envelopes must be endorsed "Medical Officer, Nursing Services Division." Canvassing is prohibited.

**MAIDSTONE. BOROUGH OF MAIDSTONE. Joint** appointments of MEDICAL OFFICER OF HEALTH for Maidstone Borough and Hollingbourn, Maidstone and Malling Rural Districts. Applications are invited for the above appointments from registered medical practitioners holding a Diploma in Public Health or other similar qualification. Joint salary in accordance with Medical Whitley Council Committee C scale, namely, commencing at £2170 a year and rising by 4 annual increments of £55 and 1 increment of £50 to £2440. An appropriate car allowance will be paid. The successful candidate will be required to commence duty on 1st January, 1958. For further particulars apply to the undersigned.

Applicatfons, stating the names and addresses of 3 referees, must be received by the undersigned not later than Saturday, 24th August, 1957. GRAHAM WILSON, Town Clerk.

13, Tonbridge-road, Maidstone.

**STOKE-ON-TRENT. CITY OF STOKE-ON-TRENT.** PUBLIC HEALTH DEPARTMENT. Applications are invited from qualified medical practitioners for the post of ASSISTANT MEDICAL OFFICER, mainly on the Maternity and Child Welfare Services. Candidates should have experience in diseases of children and obstetrics. Opportunity will be given for hospital contact with pædiatrics and obstetrics. The possession of a D.P.H. or D.C.H. will be considered an additional qualification. The salary will be at the rate recommended by the Whitley Council, with commencing salary according to experience. The appointment will be subject to the provision of the National Health Services (Superannuation) Regulations, 1947, and the successful candidates will be required to pass a medical examination.

Forms of application may be obtained from the Medical Officer of Health, Public Health Department, Glebe-street, Stoke-on-Trent, and should be returned, accompanied by copies of not more than 3 recent testimonials, not later than Saturday, 10th August, 1957. HARRY TAYLOR, Town Clerk.

**SURREY COUNTY COUNCIL. Appointment of Assistant** MEDICAL OFFICER. Applications are invited from candidates possessing the D.P.H. or D.C.H. Main duties will be in connection with the School Health and Maternity and Child Welfare Services. Salary according to experience on the scale £1050–£50–£1200–£55–£1475 p.a. The appointment is subject to satisfactory medical examination, to the provisions of the Local Government Superannuation Acts, 1937–53, and to 3 months notice on either side.

Application form from the County Medical Officer, County Hall, Kingston upon Thames, to be returned by 3rd August, 1957.

**WEST LOTHIAN. COUNTY COUNCIL OF THE** COUNTY OF WEST LOTHIAN. Applications are invited for the appointment of ASSISTANT MEDICAL OFFICER OF HEALTH from registered medical practitioners (Female) holding the D.P.H. Although not essential it is desirable for the candidate to have held a house appointment in a maternity hospital. Every opportunity will be given to the successful applicant to obtain experience in all aspects of Local Health Authority work. Salary scale £1050–£50–£1200–£55–£1475 with placing according to experience. The post is superannuable. Possession of a car for which an allowance will be provided, is essential.

Applications, giving age and full details of qualifications and experience, together with the names of 3 referees, should be lodged with the undersigned not later than 27th July, 1957.

JOHN CALDER, County Clerk.

County Buildings, Linlithgow, 9th July, 1957.

**YORKSHIRE. COUNTY COUNCIL OF THE WEST** RIDING OF YORKSHIRE. Joint appointment of SENIOR ASSISTANT COUNTY MEDICAL OFFICER AND SCHOOL MEDICAL OFFICER to the Barnoldswick, Earby, Silsden, and Skipton Urban District Councils, the Skipton Rural District Council and the West Riding County Council. Applications are invited from registered medical practitioners, Men or Women, for the above post. The successful applicant will be on the staff of the County Medical Officer's Department but will work under the administrative direction of the Divisional Medical Officer and Medical Officer of Health, who is responsible for the day to day administration of public health matters in the Division. Duties will be mainly clinical in School Health and Infant Welfare Services, but in addition the person appointed will act for the Divisional Medical Officer and Medical Officer of Health in his absence, and will be appointed as Deputy Medical Officer of Health to the above Constituent Authorities. Candidates must have at least 3 years experience since qualification and must have the D.P.H. or be completing their training for the D.P.H. The present scale of salary is £1150–£1575 p.a. Travelling and subsistence allowances according to the County Council's scale are payable in addition to salary. The post is superannuable and is subject to a medical examination.

Forms of application are obtainable from the undersigned to whom they should be returned not later than 10th August, 1957.

J. WOOD-WILSON, County Medical Officer.

County Hall, Wakefield.

## General Practice

*For an* **Executive Council post** *(England and Wales) apply on form E.C.16A obtainable from the council. Mark envelope "Vacancy."*

**BIRMINGHAM, HANDSWORTH. Applications invited** for VACANCY (urban) due to resignation of 2 partners. Combined lists approximately 4700. Residence/surgery may be available. Applications on E.C.16A to be received not later than 10th August, 1957, to—

K. F. G. DAY, Clerk of Birmingham Executive Council.

Sutton New-road, Erdington, Birmingham, 23.

**BULLBROOK AREA. BRACKNELL NEW TOWN.** Applications invited for a VACANCY in the Bullbrook Area of the Bracknell New Town, which is under development. There is no list but the successful applicant will be granted the Initial Practice Allowance, if eligible. A site will be available for purchase or on a 99 years' lease at a ground rent for the erection of a house and surgery by the successful applicant. Alternatively the Development Corporation would be prepared to build a house and surgery either for letting or for sale. The number of houses to be built in this area is 1719 and it is expected to be completed by 1962. Apply on Form E.C.16A before 14th August to—

G. H. J. PRICE, Clerk of the Berkshire Executive Council.

16, Eldon-road, Reading.

**MANCHESTER EXECUTIVE COUNCIL. Applications** invited from doctors wishing to undertake general medical services in Manchester (for death VACANCY). The approximate list number is 1800 and it is understood that the residence (and surgery) will be available to successor. Applications, on Form E.C.16A (obtainable from address below) must be received by the undersigned not later than 3rd August, 1957.

H. GLASS, Clerk of the Council.

Ardwick Town Hall, Ardwick Green North, Manchester, 12.

**NEWCASTLE UPON TYNE. Applications invited for** VACANCY (urban). List at present approximately 2987. Residence and surgeries available. Apply on E.C.16A by first post on 7th August, 1957, to undersigned. (This practice is at present held in partnership by father and son.)

K. N. OGDEN, Clerk of the Newcastle Executive Council.

16, Framlington-place, Newcastle upon Tyne, 2.

**PERTH, WEST AUSTRALIA, old-established General** Practice. Gross takings average £7500. Well-appointed modern Consulting-rooms attached comfortable family residence, valued at £5000. Goodwill £4500. Reasonable offer considered. Sell or lease with view to purchase. Terms available. Scope for major Surgery and Gynæcology.—Reply to Box 222, G.P.O., Fremantle, West Australia.

**General Practice. Doctor with West Middlesex practice,** list about 1500, wishes to exchange for similar in Parkstone, Southbourne, Poole, or Christchurch area. Living accommodation available for rent on surgery premises. Pleasant position, easy access to central London. Further particulars on request.—Address, No. 310, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

## Miscellaneous

**Assam. British Medical Officer. Required for old-**established group of Tea Estates. Age preferably 30–40 years. Clinical tropical and hygiene experience an advantage. 3-year agreement. Commencing gross income, including dearness allowance, the equivalent in Rupees of approximately £262 per month according to qualifications, &c. Bungalow with basic furniture, lighting, heating and servants free; car provided.—Applications, with 3 names for reference purposes, to: Address, No. 314, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

**Swiss Pharmaceutical Company of international repute** has a vacancy in the English section of its Medical Information Department in Basle. Candidates should be British by birth, Male, and not more than 35 years of age. A good University degree in medicine or 1 of the biological sciences is desirable but not essential if the applicant has appropriate background and experience. Preference will be given to candidates able to speak German, but their mother tongue must be English. Ability to write well is essential and experience of editing would be an additional advantage. The work is varied and interesting. Remuneration according to age and qualifications, but not less than Swiss Frs.15,000 p.a.—Applications, which will be treated in strict confidence, should set out full details of background, qualifications and experience. Address, No. 313, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

**Deputy Medical Director. A leading pharmaceutical** manufacturer in London invites applications for the newly created post of Deputy Medical Director. Candidates should be not less than 35, hold a British medical qualification, and preferably have had previous experience. A perfect knowledge of at least 1 foreign language is essential. The post is a permanent one, with a commencing salary of not less than £2500 per year with participation in the Company's Superannuation Scheme.—Reply: Address, No. 311, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

**"Pregnancy Diagnosis by the Xenopus Method," 24-hour** service. Send specimens of urine and £1 1s. fee. Hæmatology, Biochemistry, Flame Photometry.—WELBECK BIOLOGICAL LABORATORIES, 26, Park-crescent, Portland-place, W.1 (MUSeum 5386–7).

**Applicants for posts requiring testimonials copied or** duplicated should communicate with MANTON SECRETARIAL SERVICE LTD., 98, Victoria-street, S.W.1 (Phone: VICtoria 0141), who are specialists in this kind of work.

**Typewriting and Duplicating. First-class work at moder-**ate prices by experienced medical typists. Electric machines.—SYBIL RANG, 21, Heath-street, Hampstead, London, N.W.3 (HAM 5329/0504).

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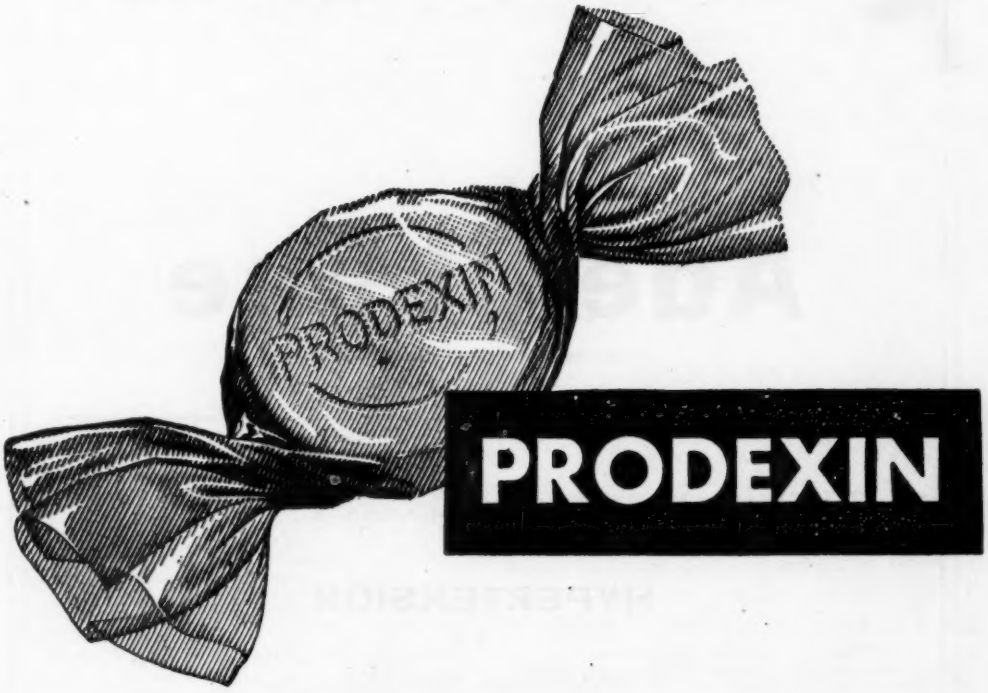


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3 **non-alkalising**
4 **non-constipating**
5 **stable, consistent and predictable**

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Dihydroxy aluminium aminoacetate...0·9 gm.
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A combination of Serpasil (reserpine CIBA) and Nepresol (1,4 dihydrazinophthazaline sulphate) for those hypertensive patients not showing adequate response to Serpasil alone.

**The Administration of Adelphane will, in many cases, prove an effective alternative to hospital treatment with ganglion-blocking agents.**

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1/7